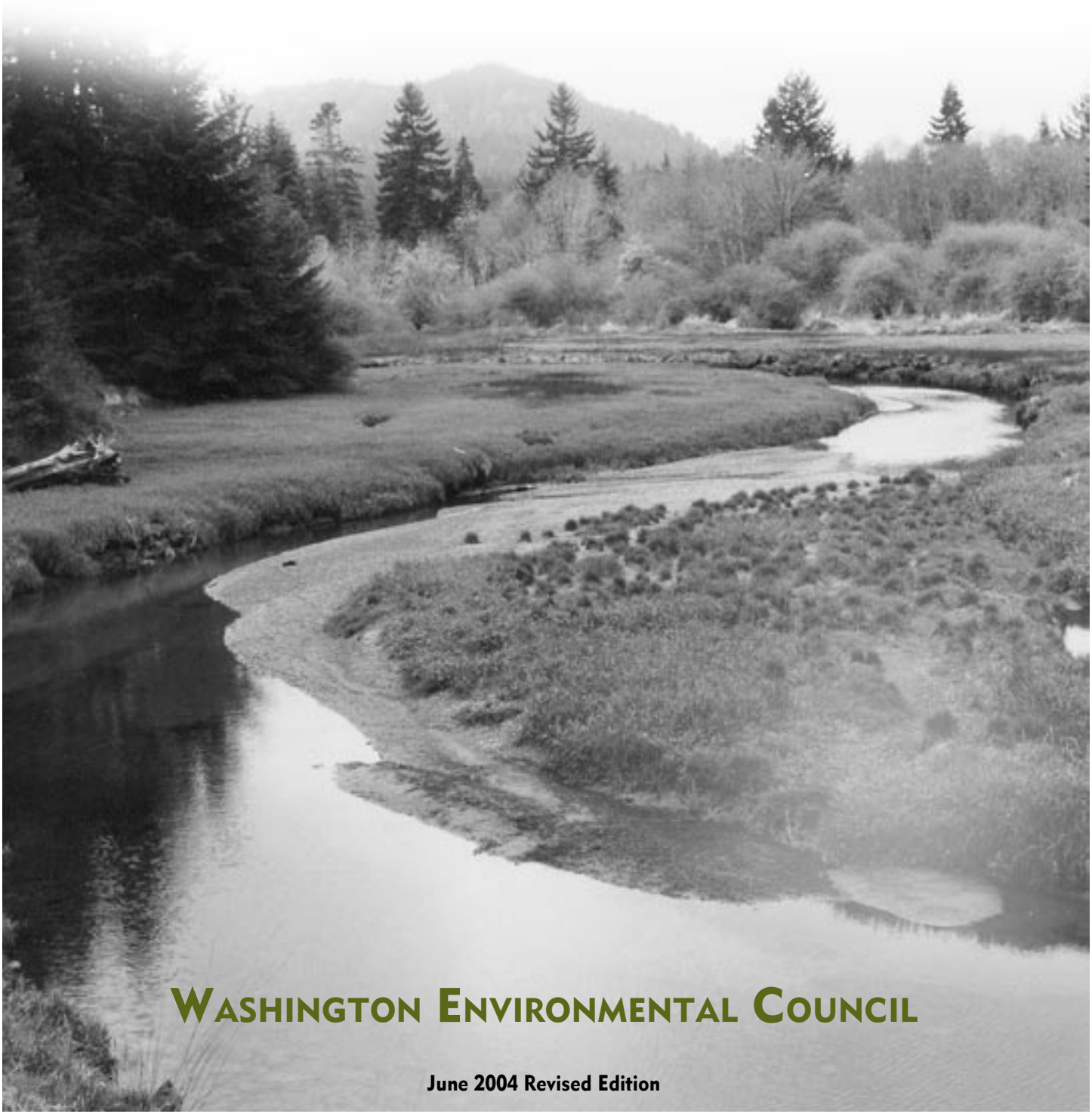
Habitat Protection Tool Kit

A Guide To Habitat Conservation Planning Under Washington's Growth Management and Shoreline Management Acts



WASHINGTON ENVIRONMENTAL COUNCIL

June 2004 Revised Edition

Table of Contents

Introduction

This Habitat Protection Tool Kit is designed to achieve three primary objectives: 1) help citizens evaluate how their local government land use planning and regulations comply with legal requirements for protecting fish and wildlife habitat; 2) to participate effectively in the process to revise such plans and regulations; and, 3) to navigate administrative and legal appeal procedures in order to address noncompliance issues.

The Washington Growth Management Act (Chapter 36.70A RCW) and Shoreline Management Act (Chapter 90.58 RCW) are key legal tools for protecting fish and wildlife habitat in Washington, and the overarching legal framework of the Growth Management Act (GMA) provides good citizen access for participating directly in their implementation. Both laws require that cities and counties across the state take a comprehensive, coordinated and proactive approach to land use and shoreline planning to guide development in their jurisdictions over several decades.

This guidebook is designed to provide the reader with basic legal and policy background on both of these pivotal laws for protecting Washington's fish and wildlife habitat, as well as information on the ecological elements and processes that need to be protected in order to effectively conserve fish and wildlife habitat.

The guide also includes a checklist (see page 35) that can be used to evaluate how well a local government's development regulations comply with legal requirements to protect fish and wildlife habitat.

Fish and wildlife are public resources of the people of Washington State. Landowners, state agencies, local governments and members of the public have a shared responsibility to protect and maintain these resources.

Open space elements of comprehensive plans, watershed and salmon recovery plans also impact fish and wildlife habitat protection but will be largely outside the scope of this guide.

The Shoreline Management Act (SMA) requires affected local governments to develop Shoreline Master Programs (SMP) that are an important feature of local development regulations. Shoreline and critical area protection regulations intersect mainly in regard to saltwater habitats, large lakes and large rivers. New state guidelines for the state SMP program were adopted in 2003 and will be addressed in the Part 2 section of this guide. Because shoreline planning must be integrated with the GMA, we will begin by examining that legal framework.

To adequately protect Washington's streamsides, lakesides, wetlands, shorelines and beaches, it is necessary to ensure planning and regulations under both the Growth Management Act (GMA) and Shoreline Management Act (SMA) are implemented effectively.

Part I: Protecting Fish and Wildlife Habitat Under the Growth Managent Act

Proper planning and enforcement under the GMA could be one of the most significant contributions to protection of the areas that are key to the survival of fish and wildlife species in Washington. Development permits trigger local government authority to review and condition most local land use actions. Therefore, some of the most powerful tools that can either threaten or protect fish and wildlife habitat are in the hands of county commissioners and city councils.

Fish and wildlife populations in Washington State are severely threatened by habitat loss and environmental degradation associated with population growth and land use. The following facts point to a growing crisis:

- Fifty six percent of Washington's rivers and 83% of all its estuaries fail to meet water quality standards (DOE, 2000).
- We have lost over 30% of the state's original wetlands, including more than 90% of wetlands in urban areas (DOE, 2000).
- It is estimated that as much as 90% of riparian habitat in Washington has been lost or degraded since the 1800s (WDFW, 1997).
- Of the 146 "species of concern" in Washington State, 37% rely on marine and estuarine habitats and 24% live in freshwater and riparian habitats.
- Across the state, salmon, trout and steelhead stocks are listed for protection under the federal Endangered Species Act.
- Puget Sound fish and wildlife have declined substantially in recent years including marine invertebrates, six species of fish, three seabirds (marbled murrelet, common murre and tufted puffin), Olympia oysters, and harbor porpoises (West, 1997).
- The State of Washington recently designated Puget Sound Orca whales as an endangered species.

The GMA will largely drive habitat protection at the local level. It is extremely significant legislation affecting fish and wildlife for our state.

By the middle of this century, Washington's population is expected to double, adding the equivalent of 29 cities the size of Tacoma or Spokane. Current land use development patterns cause reduction and fragmentation of wildlife habitat and degradation of both water resources and water quality. Development has been shown to increase water pollution, increase flooding, and raise water temperatures to levels harmful to aquatic life (USEPA, 2001). According to estimates by the Washington Department of Fish and Wildlife (WDFW), from 30,000 to 80,000 acres of fish and wildlife habitat are lost each year to development, agriculture, roads and other conversions (DNR, 1998).

Each animal species is adapted to certain habitats that meet its life needs, and the health and success of any species is directly related to the quality and quantity of habitat available to it.

"Habitat" is defined here as an area upon which fish and wildlife species depend in order to meet their basic requirements for survival: food, water, shelter, and reproduction. Examples of wildlife habitat include streams and wetlands, riparian zones, migration corridors, seasonal ranges, nesting and roosting sites, etc. Protection and restoration of fish and wildlife and their essential habitats can be justified politically, biologically and economically.

- Politically, adequate protection of fish and wildlife habitat will help to minimize the possibility of federal intervention into local decision-making. Additionally, there is broad based public support for habitat protection.
- Biologically, fish and wildlife species depend on healthy, connected habitats. The health of an ecosystem depends on biological diversity; therefore, the health of fish and wildlife populations represents a key element in the larger picture of the overall health of Washington's natural environment. The health of our natural environment is a vital component in our quality of life.
- Economically, fish and wildlife resources are a valuable resource for Washington State, generating approximately three billion dollars in recreation and commercial uses annually (WDFW, 2002).

During the next decade, the survival of many species of fish and wildlife in Washington State, including what were once the world's greatest salmon and steelhead populations, will depend upon a public commitment to protect and restore these public resources.

The GMA is extremely significant legislation affecting fish and wildlife for our state and will largely drive habitat protection at the local level. For too long, fish and wildlife concerns have been given secondary status, considered only as an afterthought in land use planning, and have tended to focus on single species and site-specific impacts. This fragmented and reactive mode of addressing fish and wildlife—only after development plans have been prepared, or species designated as threatened or endangered—is far less effective than a protection strategy that is integrated with the local planning process.

A proactive, landscape-based, comprehensive planning approach that incorporates fish and wildlife habitat conservation areas will correct two fundamental deficiencies in our current system of environmental review:

First, basing development regulations on a landscape approach to habitat conservation planning will provide a framework for addressing cumulative impacts from development projects that are usually ignored in conventional site-by-site review procedures.

Second, fish and wildlife ignore arbitrary political boundaries. Proper planning for fish and wildlife resources must be based on natural features of the landscape that, at a minimum, include an entire watershed. The GMA requirement for inter-jurisdictional cooperation in the development of planning policies can provide consistent policies and regulatory standards throughout a species' home range, help reduce loss and fragmentation of important habitats, and maintain linkages within a habitat network.

How Does The GMA Work?

The Washington State legislature enacted the GMA in 1990 and 1991 to create a coordinated planning process for both the natural and man-made environments of the state. The legislative findings declare:

…[U]ncoordinated and unplanned growth, together with a lack of common goals expressing the public's interest in the conservation and the wise use of our lands, pose a threat to the environment, sustainable economic development, and the health, safety, and high quality of life enjoyed by residents of this state. It is in the public interest that citizens, communities, local governments, and the private sector cooperate and coordinate with one another in comprehensive land use planning. [RCW 36.70A.010]

The GMA lists thirteen separate goals such as reducing sprawl, coordinating transportation planning, creating affordable housing, and maintaining essential public facilities and services [RCW 36.70A.020]. Goals specific to the natural environment and fish and wildlife are:

(8) Natural resource industries. Maintain and enhance natural resource-based industries, including productive timber, agricultural, and fisheries industries. Encourage the conservation of productive forestlands and productive agricultural lands, and discourage incompatible uses.

(9) Open space and recreation. Encourage the retention of open space and development of recreational opportunities, conserve fish and wildlife habitat, increase access to natural resource lands and water, and develop parks.

(10) Environment. Protect the environment and enhance the state's high quality of life, including air and water quality, and the availability of water.

Local planning is implemented through two steps. Each planning jurisdiction must create a Comprehensive Plan with five mandatory elements; 1) land use, 2) housing, 3) capital facilities, 4) utilities, and 5) a rural element. The jurisdiction must then adopt development regulations that match and implement the plan.

Not all local governments are required to plan under GMA. Population and growth criteria exempted 10 counties from comprehensive planning (see map below). Within counties that must or choose to plan under GMA, all cities and towns must also create comprehensive plans, to be coordinated with each other and the county.

It is important to note, however, that regardless of whether or not a jurisdiction is fully planning under the GMA, *the Act requires all cities and counties throughout the state to designate and protect Critical Areas, including fish and wildlife habitat, through development regulations* [RCW 36.70A.060 (2)].

The GMA contains a requirement that all GMA-planning jurisdictions must periodically review and, if needed, revise adopted plans and regulations to ensure compliance with the act [RCW 36.70A.130]. The requirement to update regulations to protect fish and wildlife habitat applies to all counties and cities, whether or not they are fully planning under GMA.

The 1995 amendments to the GMA require counties and cities to revise their critical areas ordinances using "best available science" by September 2002. Legislation was passed in 2002 that sets forth a revised schedule for local governments to update

Growth Management Act planning in Washington counties.

Counties fully planning under GMA

Counties planning for Critical Areas and Natural Resource Lands only under GMA

Timeline to review and, if needed, to revise comprehensive plans and development regulations

Dec. 1, 2004	Clallam, Clark, Jefferson, King, Kitsap, Pierce, Snohomish, Thurston, Whatcom counties and cities
Dec. 1, 2005	Cowlitz, Island, Lewis, Mason, San Juan, Skagit, Skamania and cities Benton, Chelan, Douglas, Grant, Kittitas, Spokane, Yakima counties and cities
Dec. 1, 2006	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grays Harbor counties and cities
Dec. 1, 2007	Klickitat, Lincoln, Okanogan, Pacific, Pend Oreille, Stevens, Wahkiakum, Walla Walla, Whitman counties and cities

GMA plans and regulations (see above)

The GMA defines five types of critical areas [RCW 36.70A.030]:

(a) Wetlands

(b) Areas with a critical recharging effect on aquifers used for potable water

(c) Fish and wildlife habitat conservation areas

(d) Frequently flooded areas

(e) Geologically hazardous areas

Of these five types of critical areas, "wetlands" and "fish and wildlife conservation areas" are the most important for wildlife protection and the only ones with wildlife habitat as an expressed value. Clearly, "wetlands" are critical habitat, providing food, cover and water. And most planners and activists are well aware of the importance of wetlands and the efforts to protect them over the past couple decades. "Fish and Wildlife Habitat Conservation Areas" have a less understood meaning and deserve further explanation.

The GMA does not define what constitutes a "fish and wildlife habitat conservation area". However, the legislature did authorize the Washington Office of Community Development (OCD) to establish minimum guidelines [Chapter 365-190 WAC] to assist cities and counties in protecting critical areas, including fish and wildlife habitat conservation areas. While the resulting guidelines are not mandatory, counties and cities must consider them when addressing critical areas protection. The OCD guidelines define the goal for fish and wildlife habitat conservation as "land management for maintaining species in suitable habitats within their natural geographic distribution so that isolated subpopulations are not created" [WAC 365-190-080 (5)]. The rule goes on to define different types of aquatic and upland habitat crucial for the protection of fish and wildlife. These are discussed in greater detail on pages 24-31.

With regard to the other three types of critical areas listed above (b, d, and e):

- "Geologically hazardous areas" should remain undeveloped and can provide open-space habitat patches;
- "Aquifer recharge areas" occur in both undisturbed and modified landscapes but, in either case, should remain unpaved and thus continue to infiltrate stormwater runoff and help to maintain natural stream flows (and safe drinking water); and,
- "Frequently flooded areas" include highly productive floodplain habitats for both fish and wildlife.

The GMA tells local governments to protect fish and wildlife habitat, but doesn't specify how they are to do this – active citizen participation in development of GMA plans and regulations is needed to ensure local government compliance.

It is important to note that the GMA provides broad discretion to local governments on how to designate and protect Critical Areas. Although OCD, WDFW and Ecology have produced guidelines and published recommendations for protection measures for wetlands and fish and wildlife habitat, each individual local jurisdiction is responsible for drafting and enforcing regulations. Consequently, it is left to citizens and/or (in rare cases) state agencies to monitor and enforce the law. This means that citizens must work diligently with their local governments to understand what existing ordinances require and what additional regulations might be necessary to ensure that the environmental goals of the GMA are being effectively implemented and the public interest protected.

For example, while a given county might have a planning policy that says "protect and enhance fish and wildlife habitat," and corresponding regulations to implement that policy, the regulations may not be sufficient to provide suitable habitats to maintain healthy populations of native fish and wildlife species within their natural range. This could happen because the regulations may protect only nesting habitat, and not roosting and foraging habitat, or travel corridors needed to provide connections between habitats, or habitat needed for breeding and seasonal movements by various wildlife species.

The GMA instructs the OCD to provide financial and technical assistance in drafting and administering GMA regulations. The OCD also monitors GMA compliance by local governments, serves as the repository of all Comprehensive Plans, grants funds for local planning, publishes rules in the Washington Administrative Code (WAC) to guide creation of plans and regulations and publishes documents to assist the planning process. The department has provided guidance on critical area requirements through several publications, such as a checklist of required elements of comprehensive plans and development regulations. OCD also coordinates the use of technical information generated by other departments of state government.

Helpful Resources

Products of particular value to planning for fish and wildlife habitat conservation include:

Priority Habitats and Species List (WDFW)

Management Recommendations for Washington's Priority Habitats and Species (WDFW)

Wetland Rating System (Ecology)

Wetland Delineation Manual (Ecology, 1997)

These products can be requested free of charge or obtained from the websites of the respective agencies:

Ecology: *www.ecy.wa.gov/*

WDFW: *http://wdfw.wa.gov/*

Photo by Brian Walsh

Critical Areas Ordinance

The GMA has two separate aspects. First, comprehensive plans are required to provide the goals and policies that will guide shoreline and land use decisions. Second, specific development regulations are required. To carry out the purposes of the comprehensive plan, these regulations must include provisions to protect critical areas from any potentially adverse impacts due to land use activities permitted by local governments.

Under the GMA, all local governments are required to:

1. Classify and designate critical areas including fish and wildlife habitat and wetlands;

2. Protect critical areas through development regulations (e.g. critical areas and zoning ordinances).

The GMA does not allow exceptions or exemptions that would leave some critical areas unprotected and does not exempt any land uses from the requirement to protect Critical Areas. Critical areas designations and protections overlay other land use designations, and local governments must regulate pre-existing land uses. Thus, any exemption for preexisting use must be limited and carefully crafted. For example, the GMA establishes multiple planning goals, including the requirement to "conserve and enhance" both salmon and agricultural land use. A categorical exemption for agricultural activities would not balance these goals and would fail to address the habitat needs of salmon. In protecting both salmon and agriculture, citizens must work with local jurisdictions to seek a balanced solution.

"…there must be no net loss of the structure, value, and functions of the natural systems constituting the protected critical areas" (Copsey, 2003).

The GMA does not absolutely prohibit development in, or impacts upon, critical areas. In addition, Growth Management Hearing Board decisions have ruled that while critical areas must be protected, not all critical areas must be protected in the same manner or to the same degree. "To 'protect' critical areas generally means to preserve their structure, value and functions…While local governments have discretion to adopt critical areas regulations that may result in local impacts upon some critical areas, or even loss of some critical areas, there must be no net loss of the structure, value, and functions of the natural systems constituting the protected critical areas" (Copsey, 2003).

Helpful Resources

An excellent example of permit and project review can be found in *Tracking Developments on Streams and Wetlands. (Thurston Regional Planning Council. November 2001).*

Best Available Science

A 1995 amendment to the GMA [RCW 36.70A.172(1)] requires that counties and cities "include the best available science in developing policies and development regulations to protect the functions and values of critical areas", including fish and wildlife habitats. It goes on to give "special consideration to conservation or protection measures necessary to preserve or enhance anadromous fisheries" (i.e., fish such as salmon and steelhead that spawn and rear in freshwater and mature in the marine environment).

The GMA does not define "best available science" (BAS). However, the Washington State Office of Community Development (OCD), adopted guidelines specifically to assist counties and cities in identifying and including the BAS in their critical area policies and regulations [WAC 365- 195-900 through 925].

The OCD best available science guidelines state that scientific information can be produced only through a "valid scientific process." This is defined as the product of research conducted by qualified individuals, using documented methodologies, with findings and conclusions peer-reviewed by qualified experts, and criticism addressed by proponents of the research.

The OCD guidelines delineate procedural and substantive limits on a local government's ability to adopt regulations that deviate from BAS. Political, anecdotal or other non-scientific information local governments rely on must be identified and its use justified. In other words, any departure from BAS must be "transparent" and scientifically defensible. Local governments must identify any risk to critical areas and identify measures to limit those risks.

The GMA requires use of "best available science " in designating critical areas, protecting their functions and values, preserving and enhancing anadromous fisheries, and identifying the risks associated with alternative approach for accomplishing these goals. The guidelines state that development regulations should fall within a range of alternatives contained within limits defined by BAS. Within that range, however, not all possibilities have equal scientific validity. Because the statutory language is clear that "protection" of critical areas is required, each alternative should be assessed from the perspective of whether it is capable of achieving the required protection. Alternatives at the low end of the range of BAS, whose protective capabilities may be in question, impose a high level of risk whereas alternatives at the high end of the range impose a far lower level of risk.

Photo by Brian Walsh

Where there is a question of the alternative's protective capability, even if within the range of BAS, the "precautionary" approach (Noss, 1997) would require that the local governments implement the alternative that will not place the resource at risk.

Where cities and counties lack scientific information, the guidelines encourage local governments to 1) take a precautionary or "no risk" approach in which development and land use activities are strictly limited until the uncertainty is sufficiently resolved; and 2) employ an effective "adaptive man-

agement" program that relies on scientific methods to evaluate how well regulatory and non-regulatory actions will achieve their objectives and make timely changes in response to that feedback. The guidelines advise that the feedback loop from management results should operate quickly enough to be able to detect deficiencies in the program and correct them before the resource is placed at risk.

Finally, WAC 365-195-915 states that local governments should adopt procedures and criteria to ensure that the best available science is included in every review of an application for an administrative variance or exemption.

Monitoring and Adaptive Management

Monitoring provides feedback to assist in adaptive management. Monitoring answers three kinds of questions:

- Implementation – are land use practices and management decisions implemented?
- Status and Trends – is the status of the resource changing?
- Effectiveness – Did the action meet its objectives? Does it validate cause-and-effect relations?

However, monitoring is merely an academic exercise if the information derived from it is not used for making decisions. Adaptive Management uses the knowledge and data produced by monitoring to redirect actions. Monitoring and adaptive management together represent "learning to manage by managing to learn." Monitoring and adaptive management require adequate and stable funding as well as acceptance and management of risk.

Helpful Resources

Critical Areas Assistance Handbook
The State of Washington Department of Community Trade and Economic Development (CTED) provides technical and financial resources to local governments to support Growth Management planning. In addition to promulgating regulations that provide guidance on implementation of GMA, CTED has issued guidance to assist local governments throughout the state with adopting and updating Critical Areas regulations. The guidebook was formulated based on legislative and administrative rules and guidance, best available science and recommendations from the departments of Fish & Wildlife, Natural Resources and Ecology as well as other agencies. A copy of this publication may be obtained from CTED at: *www.cted.wa.gov/*

Special Consideration For Anadromous Fisheries

Giving "special consideration" for anadromous fisheries limits local government discretion and directs measures for both "preservation and enhancement" of habitats for salmon, steelhead and trout species.

Anadromous fisheries have been important for the region for generations. With regard to planning, WAC 365-195-925 (3) provides guidance on conservation or protection measures necessary to preserve or enhance anadromous fisheries pursuant to RCW 36.70A.172. In particular, the citation states, "Measures that protect habitat important for all life stages of anadromous fish, including, but not limited to spawning and incubation, juvenile rearing and adult residence, juvenile migration downstream to the sea, and adult migration upstream to spawning areas" and "habitat protection measures based on the best available science relevant to stream flows, water quality and temperature, spawning substrates, instream structural diversity, migratory access, estuary and nearshore marine habitat quality, and the maintenance of salmon prey species."

This rule requires that consideration must be given to the physical, chemical and biological processes that contribute to the maintenance of fish habitat to "preserve or enhance" anadromous fisheries.

This approach will require local governments to go beyond protection of existing habitat elements to focus on the system-wide ecological processes that create and maintain these habitat elements in both marine nearshore and freshwater environments. In other words, if you don't save the processes, you won't save the parts.

Everything else being equal, the science applicable to site specific conditions is preferable for protecting the functions and values of critical areas. Anadromous fish stocks exist because of local adaptation and homing. Therefore, local governments must give special consideration to those habitats and ecological processes that support the unique life history strategies of individual fish stocks within their jurisdictions.

The conservation, protection and recovery of anadromous fisheries will ultimately depend on protecting these reproductively isolated, self-sustaining populations ("stocks") which are the ultimate building blocks of any fisheries conservation strategy.

Anadromous fish stocks are adapted to the characteristics of individual river/stream systems. The flow regime and floodplain functions (overbank flooding, erosion/deposition) of each individual river system determine its channel shape and the range of physical habitats it can support. In addition to physical features, these conditions include the riparian vegetation and biological communities occurring within the river and its valley. All these factors make up the important and individual hydrographic signature of each river/stream system and should be protected and where feasible, restored.

Helpful Resources

National Marine Fisheries Service
Federal agency charged with conservation, protection, and management of Pacific salmon, groundfish, halibut and marine mammals and their habitats under the Endangered Species Act (ESA) and other laws.
www.nwr.noaa.gov/

Salmon Information Center
Tri County Endangered Species Act Response Effort including information on salmon recovery
www.salmoninfo.org/

U.S. Fish and Wildlife Service
Principal Federal agency charged with protecting and enhancing fish, wildlife, and plants and their habitats
www.fws.gov/

Washington Department of Fish and Wildlife
Technical Assistance for Habitat Protection:
http://wdfw.wa.gov/habitat.htm

Washington Conservation Commission
Habitat Limiting Factors Identification in Washington Water Resource Inventory Areas
http://salmon.scc.wa.gov/

Citizen Enforcement Of The GMA: Laying the Groundwork for A Successful Appeal

Active citizen participation in shaping GMA plans and regulations is vital to ensure compliance with the GMA goal to protect fish and wildlife habitat. The GMA does not prescribe how local governments should protect critical areas: existing state guidelines are advisory in nature, and development regulations adopted by local governments to implement this requirement are presumed to be valid upon adoption. The burden is on the petitioner to demonstrate noncompliance [RCW 36.70A.320 (3)].

A petitioner bringing an appeal bears the full burden of showing that the local action is "clearly erroneous" in complying with the requirements of the GMA [RCW 36.70A.320]. This threshold has been interpreted to mean that a Growth Management Hearings Board (Board) shall find compliance unless it determines that the action is "clearly erroneous" in view of the entire record before the Board and in light of GMA requirements, leaving the review Board with the "firm and definite conviction that a mistake has been made." Fortunately, the GMA provides an appeal process that is relatively inexpensive, and generally effective at resolving disputes. There are three regional Growth Management Hearings Boards (Boards) that review GMA appeals and decide whether local government plans and regulations comply with the GMA. Each Board hears only those matters pertaining to cities and counties located within its jurisdictional boundaries. The three regional Boards are:

- Eastern Washington Board for local governments located east of the crest of the Cascade mountains;
- Central Puget Sound Board for local governments in King, Pierce, Snohomish, and Kitsap counties; and
- Western Washington Board for all other local governments.

"Although local governments have broad discretion in developing comprehensive plans and development regulations tailored to local circumstances, that discretion is bounded by the goals and requirements of the GMA." King County v. Central Puget Sound Growth Manage-ment Hearings Board, 142 Wn.2d 543, 555-59 (2000) (King County II).

The GMA requires that local governments provide procedures for "early and continuous public participation" in developing planning policies, and implementing regulations. Importantly, giving oral, and preferably written testimony at public hearings provides legal "standing" necessary for citizens to challenge planning outcomes. GMA appeals are generally based entirely on the "record" that is created during the local government adoption or amendment of comprehensive plans and/or development regulations. Therefore, a key part of citizen participation is making sure that sufficient evidence is in the record to support the best decision.

It is critical that citizens and organizations include the factual basis and scientific sources for the opinions expressed in their testimony to serve as the basis for any subsequent administrative or legal review. If you want a scientist's views or a scientific study on record, make sure to present them during the process. Parties to an appeal are not allowed to introduce or refer the Board or a court to new facts, data, documents, or expert or lay testimony that was not presented to local government officials during the public process. It is also important to know that the Board limits the scope of appeals to the issues raised by you when you testified or commented to the local government. Get all your issues into the public record in as much detail as possible.

Oral testimony always should be accompanied by a written copy of the remarks and, if appropriate, by any supporting documentation. Wherever possible, provide copies of all documents you reference or upon which you rely in your comment letter. Provide your comments as early as possible

in the process. The ideal time is when the planning commission is developing recommendations. If the legislative body (e.g. Board of County Commissioners) has another public comment period, you can comment again on changes to the original recommendation or continued concerns. You also can call attention to documents already submitted and in the record. Finally, keep copies of everything you submit. A request for review to a regional Growth Management Hearings Board is initiated by filing an appeal—called a "petition"—within 60-days of the date the local government publishes a notice of adoption in the city or county's legal newspaper. *This deadline is strictly enforce*d.

The Boards have strict rules of procedure. For example, the petition must contain a "detailed statement of the issues presented for resolution by the board that specifies the provision of the GMA or other statute allegedly being violated and, if applicable, the provision of the document that is being appealed," as well as a "statement specifying the type and the basis of the petitioner's standing before the board pursuant to RCW 36.70A.280(2) [WAC 242-02-210]". The Boards limit both personal and issue standing. Don't expect that you can appeal any issue you didn't raise yourself before the local government.

Each Board publishes a Digest of Decisions, which contains summaries of the major holdings of the Board. The full text of final decisions and orders of all the Boards are available on their joint website at: www.gmhb.wa.gov. Generally, a Board will rely on its previous decisions when an issue is raised that it has already ruled upon, and decisions by the other two Boards may also influence a Board decision.

There are also rules that govern the service and filing of appeals. These procedural rules [WAC 242-02 and 242-04] can be accessed from the Washington State Office of the Code Reviser website at http://slc.leg.wa.gov/. Legal issues should be written in question format that the Board can answer "yes" or "no". A legal issue is an allegation that a local government (city or county) action either fails to comply with specific goals and/or requirements of the GMA, the Shoreline Management Act (SMA) or State Environmental Policy Act (SEPA) (as to the GMA or SMA

actions) or is inconsistent with some GMA-adopted enactment, such as a countywide planning policy, a comprehensive plan, or a development regulation. A legal issue should cite which specific provisions of the local government action are alleged not to comply with which specific provisions of which statute; or which specific provisions of a local government action are inconsistent with which specific provisions of which GMA-adopted enactment. A legal issue may include a phrase that briefly identifies the reason for the allegation of noncompliance and/or inconsistency. Legal issue statements should generally be brief, and devoid of argument or evidence, both of which will be presented by the respective parties in the written briefs and during oral argument at the hearing on the merits. For example:

> Did the City/County adoption of its comprehensive plan fail to comply with the requirements of RCW 36.70A.140 because it does not provide for early and continuous public participation?

If you intend to seek a penalty (invalidity or a recommendation for sanctions) you should include this request as a separate issue statement (e.g. "For any issue found not in compliance with the GMA should there be a finding of invalidity or a recommendation for sanctions?"). Each Board has guidelines for framing legal issues that may be obtained by contacting the appropriate Board. Appeals related to critical area and natural resource land protection in counties not required to meet the full requirements of the GMA are taken directly to superior court. A "failure-to-act" petition may be filed at any time after the date of a required action if the local government fails to act (for those actions, no prior "participation" is required).

Both ordinary citizens and organizations can bring appeals to the boards; however, *in order to appeal to a board, the citizen or the organization must have participated orally or in writing before the local government in the matter being appealed.* You may make your personal comments at a hearing applicable to your organization and yourself by stating that your comments are given on behalf of yourself and the (named) organization, assuming your organization has authorized you to speak on its behalf.

After development regulations have been adopted, citizens may participate in the enforcement of these regulations. Generally, local codes have a chapter on enforcement and most cities and counties have an enforcement officer. When code violations come to the attention of a citizen, typically they can report the violation by making a code enforcement complaint. Generally, a citizen making a complaint must apply steady pressure to ensure that appropriate action is taken.

Helpful Resources

GMA laws and regulations GMA laws and regulations can be accessed at the Washington Office of the Code Reviser at: *http://slc.leg.wa.gov/*

Directory of useful GMA and Smart Growth information 1000 Friends has compiled a directory of useful information about Smart Growth, Washington's Growth Management Act, as well as links to other good land use resources: *www.1000friends.org/smart_growth/smart_growth.cfm*

Hearings Boards decisions and orders The full text of final decisions and orders of all the Boards are available on their joint website at: *www.gmhb.wa.gov*

Part 2: The Shoreline Management Act

To adequately protect Washington's streamsides, lakesides, wetlands, shorelines and beaches, it is necessary to ensure planning and regulations under both the Growth Management Act (GMA) and Shoreline Management Act (SMA) are implemented effectively.

Washington's Shoreline Management Act (90.58 RCW) applies to more than 20,000 miles of shorelines statewide (2,763 miles of marine shoreline, 2,300 miles of lake shores, and approximately 16,000 miles of streams).

"Shorelines of the state" (see sidebar) include freshwater, marine and nearshore habitats such as rivers, streams, wetlands and lakes; eelgrass meadows, kelp forests, tidal marshes and estuaries; sand spits, beaches, shoreline banks and bluffs; and associated riparian zones. Taken together, these shoreline habitats sustain in large measure a biologically diverse and interconnected ecosystem.

The Shoreline Management Act (SMA) was adopted in 1971 in response to a WEC initiative to protect the state's shorelines from uncoordinated and piecemeal development.

A basic premise of the SMA is that "shorelines of the state are among the most valuable and fragile of its natural resources," and that coordinated planning is necessary in order to protect against "adverse effects to the public health, the land and its vegetation and wildlife, and the waters of the state and their aquatic life." [RCW 90.58.020]

The SMA recognizes that shoreline areas, being a limited ecological and economic resource, are the setting for competing uses, and establishes a broad policy giving preference to those uses that protect the environment and depend on proximity to the shoreline. RCW 90.58 020 states: "[U]ses shall be preferred which are…unique to or dependent upon use of the state's shorelines."

The SMA establishes a balance of authority between local and state government: cities and counties are the primary regulators, while the Department of Ecology (Ecology) reviews and approves local Shoreline Master Programs (SMP) and permit decisions to ensure compliance with the policy and provisions of the SMA and the state Shoreline Master Program Guidelines ("shoreline guidelines").

While each SMP includes a system for permitting shoreline uses, the SMA does exempt certain developments from the need to obtain a permits, including single-family residences, maintenance and repair of existing structures, and docks worth less than $5,000 (salt water) or $10,000 (fresh water); however, activities exempted from permits must still comply with all policies and regulations of local master programs.

Each city and county adopts a SMP that is based on the state shoreline guidelines, but tailored to local shoreline environments and reflects the planning goals of local communities [WAC 173-26-171].

These local government SMPs combine both plans

The Shoreline Management Act applies to all "shorelines of the state," defined in state law at RCW 90.58.030(2) as:

- **all marine waters of the state out to the western state boundary in the Pacific Ocean (the three-mile limit);**
- **streams and rivers with a mean annual flow greater than 20 cubic feet per second (20 cfs);**
- **lakes and reservoirs greater than 20 acres in area;**
- **upland areas called shorelands that extend 200 feet landward from the edge of these waters; and,**

The following areas when they are associated with one of the above:

- **biological wetlands and river deltas; and,**
- **some or all of the 100-year floodplain including all wetlands within the 100-year floodplain.**

and regulations. The SMP planning goals represent a vision of how local shorelines will be used and developed over time, while the regulations provide the standards that shoreline uses must meet, i.e., the specific, enforceable controls and standards for shoreline development. Regulations in SMPs are often referred to as "use requirements" and the plans also contain guiding policies that support development regulations for specific shoreline "use" categories such as agriculture, aquaculture, mining, commercial, industrial, recreation and boating facilities.

During the next decade, more than 200 cities and all 39 counties in Washington State are required to update plans and regulations for shorelines within their jurisdictions using the new state Shoreline Master Program Guidelines (Chapter 173-26 WAC). This requirement will provide a highly significant opportunity to enhance the conservation and wise management of this "most valuable and fragile" of the State's natural resources.

"Environment designations" are an essential component of SMPs. There are six recommended categories: "natural," "rural-conservancy," "urban conservancy," "high-intensity," "shoreline residential," and "aquatic." Local governments may modify these state-recommended classifications to better accommodate shoreline areas with unique characteristics. Policies are developed for each designation, reflecting the specific purpose and intent of each shoreline environment and its specific conditions.

Shoreline use policies establish the principles that apply to each use category (e.g., industry, residential development, etc.) and serve as a bridge between SMP plans and use regulations.

Discrete shorelines segments are then classified into specific environment "designations" based on inventory and analysis of: their physical, biological and development characteristics; ecological functions; and, the role they play in ecosystem-wide processes (see sidebar on page 18). This designation/classification system functions as overlay within the SMA jurisdiction, and also serves to identify ecological functions, i.e. the interaction of physical, chemical and biological factors that produce the landscape and habitats characteristic of each shoreline area. Effective shoreline management requires that the SMP prescribe environmental protection measures, allowable use provisions, and development standards that address the unique setting for each designated shoreline segment. This system of shoreline environmental designation provides a basis for encouraging uses that will protect the character of distinctly different shoreline areas and for uniformly applying policies and use requirements within those areas.

Taken together, the inventory, assessment and designation, along with the policies and use regulations, provide the tools to ensure that updated SMPs will adequately protect shorelines. At the same time, they authorize land uses consistent with the SMA's preference for water dependent uses that do not adversely impact the shorelines.

Ecology's New Shoreline Management Guidelines

New shoreline guidelines were adopted in 2003 that reflect advancements in science relating to how freshwater and saltwater shorelines should be managed; changes in case law; the character of shoreline development, and new innovations in shoreline management practice. Over the next decade, every city and county must update their shoreline master programs to be consistent with the new shoreline guidelines (see right).

The SMA charges Ecology with periodically reviewing and amending the shoreline guidelines that govern the preparation of local government SMPs. However, until recently, the rules had not been updated since 1972 when they were originally established by the Department of Ecology. Most of the hundreds of local SMPs currently in effect do not reflect significant advances made in the science of shoreline management and fail to meet contemporary interpreations of protection standards set forth in the SMA.

One indicator of this failure is the annual net increase in shoreline armoring such as bulkheads and seawalls that often result in habitat loss and degradation. This "hardening" of the natural shoreline can change how beaches function by affecting sediment transport and the way wave energy is naturally dissipated on the beach. Today, a third of Puget Sound's shorelines are hardened by structures, with 1.7 miles of Puget Sound shoreline being newly armored each year impacting beach and nearshore habitats and the creatures that depend on those habitats.

In King County alone, recent surveys have shown that armoring comprises 75-87% of the coastline. The cumulative impacts of these shoreline modifications are reducing the productive capacity of our state's waters and associated shoreline areas (Williams & Thom, 2001). Recent research shows that approximately half of all these shoreline modifications are associated with single-family residences (PSAT, 2002). To comply with the new shoreline guidelines, future residential development must be located and designed to avoid the need for shoreline armoring, and stabilization measures for existing homes should not be allowed unless there is

Local governments are now required to amend their local shoreline master programs consistent with Ecology's guidelines in accordance with the following schedule:

On or before December 1, 2005, for the city of Port Townsend, the city of Bellingham, the city of Everett, Snohomish county, and Whatcom county ("early adopters") (Everett was later changed to 2018);

On or before December 1, 2009, for King county and the cities within King county greater in population than ten thousand;

On or before December 1, 2011, for Clallam, Clark, Jefferson, King, Kitsap, Pierce, Snohomish, Thurston, and Whatcom counties and the cities within those counties;

On or before December 1, 2012, for Cowlitz, Island, Lewis, Mason, San Juan, Skagit, and Skamania counties and the cities within those counties;

On or before December 1, 2013, for Benton, Chelan, Douglas, Grant, Kittitas, Spokane, and Yakima counties and the cities within those counties; and

On or before December 1, 2014, for Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grays Harbor, Klickitat, Lincoln, Okanogan, Pacific, Pend Oreille, Stevens, Wahkiakum, Walla Walla, and Whitman counties and the cities within those counties.

Jay Manning, President Washington Environmental Council 2000-2004, speaks at bill signing of SMA updates in March of 2003 with Governor Locke (r) and Don Brunell (l), President of Association of Washington Business.

The new shoreline guidelines call for achieving a "net gain" in shoreline ecological function.

"conclusive evidence, documented by a geo-technical analysis, that the structure is in danger from shoreline erosion caused by tidal action, currents, or waves." [WAC 173-26-231 (3)(a)(iii)]

Another improvement found in the new shoreline guidelines is the requirement that local governments identify and address cumulative impacts of all new shoreline development. This is important, for example, because the impacts of hardening any one property may be minimal but cumulatively the impact of this shoreline modification is very significant. New development in shoreline areas will either avoid new impacts or provide mitigation sufficient to achieve "no net loss of shoreline ecological functions;" and—perhaps most important—that a shoreline restoration plan is developed and implemented. WAC 173-26-201 (2) (f) states: "master programs shall include goals, policies and actions for restoration of impaired shoreline ecological functions. These master program provisions should be designed to *achieve overall improvements in shoreline ecological functions over time,* when compared to the status upon adoption of the master program" (emphasis added). This provision represents a vital step to reverse the decline of wild salmon and other shoreline associated fish and wildlife.

It is important to note that this language also adds a crucial new element for shoreline planning: the concept of achieving a net gain in shoreline ecological function. This concept brings the shoreline guidelines into consistency with the 2000 Puget Sound Water Quality Management Plan that is intended to provide the framework for managing and protecting the Puget Sound. The Marine and Freshwater Habitat Protection Program Goal in that Plan is: "To preserve, restore and enhance the ecological processes that create and maintain marine and freshwater habitats and to *achieve a net gain in ecological function* and area of those habitats within the Puget Sound basin" (emphasis added). The requirement for local governments to include identification of ecologically degraded shorelines in their comprehensive shoreline inventories, and to include in their amended SMP measures for restoration for those shoreline reaches, will also provide long-term guidance for future habitat restoration efforts.

The new shoreline guidelines, together with the requirement to coordinate critical areas planning under the Growth Management Act with shoreline planning, should result in significantly greater protection and restoration of shoreline habitats in Washington State.

"Ecological functions" means the role played by the physical, chemical, and biological processes that create and maintain shoreline environments that make up the shoreline's natural ecosystem.

"Ecosystem-wide processes" means the suite of naturally occurring physical and geological processes of erosion, transport, and deposition; and specific chemical processes that shape landforms within a specific shoreline ecosystem and determine both the types of habitat and the associated ecological functions. [WAC 173-26-020 Definitions]

SMA/GMA Integration

In 1995, the SMA was added as a goal in the GMA, with SMPs recognized as an element of the local government Comprehensive Plan. Although critical areas in shorelines are to be identified and designated under the GMA, they are to be protected under the SMA once Ecology approves an SMP adopted pursuant to Ecology's new shoreline guidelines. The standard for that protection must be "at least equal to that provided by the local government's critical area regulations adopted under the GMA." Where a particular critical area or its buffer lies only partly within the normal jurisdictional limit, the local government may extend the shoreline jurisdiction to include the entire critical area and all lands necessary to protect the critical area. If the local government chooses not to extend its shoreline jurisdiction, the entire critical area and its buffers must be protected under the local government's CAO adopted under the GMA. However, the SMP will still apply to the portion of a critical area or its buffers that lie within the shoreline jurisdiction. However, until such time that a local government updates its SMP, the local government's GMA critical areas regulations continue to apply to designated critical areas throughout the jurisdiction (Ecology/CTED, 2004).

The shoreline guidelines define critical saltwater habitats to include "all kelp beds, eelgrass beds, spawning and holding areas for forage fish, such as herring, smelt and sandlance, subsistence, commercial and recreational shellfish beds, mudflats, intertidal habitats with vascular plants, and areas with which priority species have a primary association." Shoreline critical freshwater habitats include those portions of streams, rivers, wetlands, and lakes, their associated channel migration zones, and flood plains that lie within the shoreline jurisdiction. [WAC 173-26-221(2)(c)(iii)(A) and (iv)(A)]

The shoreline guidelines specify that planning objectives of shoreline management provisions for critical areas "shall be the protection of existing ecological functions and ecosystem-wide processes and restoration of degraded ecological functions and ecosystem-wide processes. The regulatory provisions for critical areas shall protect existing ecological functions and ecosystem-wide processes" [173-26-221(2)(B)(iv)].

While the shoreline guidelines do not explicitly require use of "best available science" as found in the GMA [RCW 36.70.A.172(1)], they do adopt verbatim the scientific requirements set for in the SMA which are at least as rigorous [WAC 365-195-900-925].

The Public's Role in Shoreline Management

The SMA supports public involvement in shoreline decision-making. State rules require that local governments hold at least one public hearing before approving an SMP (WAC 173-26-100). However, many jurisdictions hold several public meetings, workshops and hearings. Hearing announcements must be published in at least one newspaper of general circulation in the areas affected by the amendments. Citizens participate on advisory boards preparing local master programs, and an opportunity for public comment is required for individual permits.

While the shoreline guidelines set high levels of environmental protection, they do not specifically direct a local government how to achieve this result. Because the shoreline guidelines afford counties and cities such considerable discretion in developing local plans, strong citizen involvement will be needed to assure the plans are consistent with the intent of the SMA to protect and restore local shorelines of the state and are also properly implemented. Without strong implementation, enforcement and monitoring of local shoreline regulations developed through local shoreline plans and regulations, degradation and loss of critical shoreline associated fish and wildlife habitats will continue.

Shoreline Appeals

Once the local legislative body has approved the SMP, the amendment package is forwarded to Ecology for state review and approval. Local government submittals of master program amendments to Ecology must conform to state rule requirements (WAC 173-26-110.)

Ecology's approval of local SMP adoptions or amendments is subject to appeal. Depending on the jurisdiction, the appeal is heard by the Washington State regional Growth Management Hearing Boards (GMHB) or the Shorelines Hearing Board (SHB).

If a jurisdiction is "fully planning" under the GMA, the appropriate GMHB hears appeals within 60-days of the date the local government publishes a notice of adoption in the city or county's legal newspaper.

The SHB hears appeals of Ecology's decisions on SMPs from jurisdictions not fully planning under GMA. In this case, the appeal must be filed within thirty days of the date of Ecology's written notice to the local government of the department's decision to approve, reject, or modify a proposed master program or master program amendment as provided in RCW 90.58.090(2). Shoreline permits are appealed to the Shorelines Hearings Board by filing a petition for review within twenty-one days of the date of filing as defined in RCW 90.58.140(6).*These deadlines are strictly enforce*d.

Helpful Resources

Ecology's Shoreline Management home page: *www.ecy.wa.gov/programs/sea/SMA/index.html*

Puget Sound Action Team guidance for implementing elements of the Puget Sound Water Quality Management Plan through the update of comprehensive plans, critical areas ordinances and development regulations: *www.psat.wa.gov/Programs/GMA/GMA.htm*

www.psat.wa.gov/Publications/manplan00/mp_index.htm

Part 3: Conceptual Ideas For Enhanced Conservation Planning

"Low Risk" Habitat Conservation Planning

The only way to sustain healthy populations of fish and wildlife is to adequately protect habitat and the physical, chemical and biological processes that maintain biological integrity, or "properly functioning conditions," necessary to sustain that habitat. Therefore, the planning goals for fish and wildlife habitat conservation and restoration must include protecting an ecosystem's overall health and wholeness, including the presence of all appropriate elements (physical and biological) and the occurrence of all processes (e.g., sediment transport, riparian community succession), functioning at appropriate rates and scales. Because suitable conditions for all species and life history stages will be supplied by providing them the conditions under which they naturally evolved, evolutionary history provides the basis for assessing biological integrity. Knowledge is imperfect, and the science of ecology is no exception. Science cannot provide a simple, declarative answer for managing complex ecological systems that have been, or will be, modified by human impacts. There is always a continuum of risk where human intervention is involved—doing one set of actions might give a 50% chance of protecting habitat and another might give a 100% chance. However, at any given point in the evolution of scientific understanding, there is a prevailing wisdom or consensus that can be employed as a guide for risk management. The "low risk" strategy we describe herein will provide the best chance of protecting fish and wildlife habitat, based upon the best available science, and that is the strategy we urge citizens and planning jurisdictions to adopt.

Conservation planning should be conservative in the sense of being more willing to err on the side of protecting too much rather than protecting too little. This basic principle of conservation biology is known as the "precautionary principle" (Noss, 1997). A "low risk" conservation planning strategy for fish and wildlife habitat should embody two principles that will ensure effective protection:

- Prevent new impacts ("do no harm" and "no net loss"); and,
- Employ the "precautionary principle", i.e. the greater the uncertainty, the more conservative a habitat conservation plan should be.

In addition, a low risk approach will require a monitoring and adaptive management program. "Adaptive management" means the capacity to alter management practices in response to new information and changing conditions. Adaptive management is an approach that uses monitoring and research to allow projects and activities (for development, redevelopment and restoration) to go forward in the face of some uncertainty regarding outcomes. The key provision of adaptive management is the responsibility to alter management to incorporate new information and understanding gained after action is taken. Monitoring and adaptive management elements must function at a comprehensive, programmatic level, be designed to protect all critical areas, and address potential cumulative impacts to affected critical area functions and values.

One way to accommodate the precautionary principle, while still providing flexibility for project applicants, is to employ a dual-option approach that establishes conservative default protection standards while allowing flexibility for site specific plans tailored to local conditions.

Designating buffer areas between zones of incompatible land uses is a common regulatory mechanism to minimize environmental impacts. At the same time, management prescriptions may be appropriately adjusted for site-specific conditions. This option may allow for buffer averaging, whereby a given buffer can be reduced in one area needed to

A 2002 statewide poll commissioned by the Washington Environmental Council found that two-out-of-three voters support a "better safe than sorry" approach to preventing pollution by prohibiting business or agricultural activities that may pollute our waters.

Washington Department of Fish & Wildlife Recommended Riparian Habitat Areas (RHA) widths by Stream Type

Stream Type	Recommended RHA widths
Type 1 and 2 streams; or Shorelines of the State, Shorelines of Statewide Significance	250
Type 3 streams; or other perennial or fish bearing streams > 5 ft wide	200
Type 3 streams; or other perennial or fish bearing streams < 5 ft wide	150
Type 4 and 5 streams; or intermittent streams and washes with low mass wasting potential	150
Type 4 and 5 streams; or intermittent streams and washes with high mass wasting potential	225

Note: buffer width measurement should begin at the edge of the channel migration zone (CMZ); when present. For an explanation of stream types and CMZ, see Mitigation section on next page.

accommodate development and expanded elsewhere to maintain equivalent area overall. Additionally, active management—if properly designed and implemented—has the potential to protect or restore critical area functions more quickly than simply establishing "no touch" buffers.

However, before such actions are allowed, minimal precautionary standards for conservation programs should be developed and adopted as part of a development regulation. Variable width, site specific buffers should be permitted only in those situations that are guided by an approved habitat management plan that demonstrates how critical area functions will be protected. Under this option, development proposals are reviewed based on a credible habitat evaluation that identifies which habitat functions are likely to be affected by the proposed development and provides mitigation measures consistent with local government habitat goals and objectives (see Mitigation, page 23). The table above illustrates the range of conservative, default buffer widths recommended by the Washington Department of Fish and Wildlife (WDFW) for protecting Riparian Habitat Areas (RHA) on different stream types. These are broad, statewide recommendations based on the best available science and are designed to accommodate the needs of fish and wildlife that depend on healthy riparian habitat. (WDFW, 1997)

In addition, the WDFW Priority Habitats and Species Program (PHS) provides a range of tools that can be used by local governments for making land use decisions, including maps and reports that answer the most common questions regarding fish and wildlife species. PHS also identifies fish and wildlife resources that are considered a priority for management and conservation. PHS and the WDFW management recommendations in PHS are one very important source of best available science, but citizen activists must not rely exclusively on the general management recommendations in the PHS document. It is vital that citizens also cite the specific studies and conclusions cited in the PHS document as well as other sources of BAS that substantiate the citizen's claims.

Following are some general principles for regulating stream and wetland buffers:

- Use integrated, watershed-based approach to management of stream network. Provide functional riparian buffers on all channel types. Use watershed and salmon recovery plans as the basis for establishing reasonable use standards within buffers.
- Establish scientifically credible administrative procedures for modifying standard buffers based on knowledge of local watershed characteristics and site-specific information.
- For streams, base buffer design on knowledge of watershed characteristics, stream processes (channel types), and needs of "priority" fish and wildlife species.
- For wetlands, design buffers based on wetland type, adjacent land use, soil type, slope gradient, existing buffer characteristics, and needs of "priority" wildlife species.

Helpful Resource

Annotated Bibliography on Adaptive Management Resources *www.for.gov.bc.ca/hfp/amhome/ANNOBIB/Ambib.htm*

Mitigation

Critical Areas Ordinances should include regulations ensuring that each permitted development will not cause a net loss of ecological functions. However, local governments are obliged to also design and implement regulations to be consistent with legal limitations on the regulation of private property. Situations will arise in which development is allowed to occur within or adjacent to fish and wildlife habitat. In these cases, "mitigation" must be employed to ensure no net loss of critical area functions occurs. To achieve this end, the following standard mitigation "sequence" must be applied in the following order, in accord with rules implementing the State Environmental Policy Act of 1971 [WAC 197-11-768]:

(1) Avoiding the impact altogether by not taking a certain action or parts of an action;

(2) Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts;

(3) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;

(4) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;

(5) Compensating for the impact by replacing, enhancing, or providing substitute resources or environments; and/or,

(6) Monitoring the impact and taking appropriate corrective measures.

In addition, two overarching principles should generally apply to mitigation done in exchange for loss or damage that is unavoidable:

- Mitigation should be in advance and proven; and,
- Mitigation should be in-kind.

These up-front assurances are crucial because many mitigation efforts have proven to be failures. By requiring the mitigation to be the same kind, as well as completed and shown to be working before the harmful activity is allowed to proceed, the function of the habitat is much more likely to be protected.

Local governments should provide evidence that "compensatory mitigation" was not considered until all the other steps of mitigation sequencing have been carried out in the order listed, with the burden of proof on the permit applicant to demonstrate impacts are "unavoidable." Compensatory measures should also occur on site, or within the same stream reach or sub-basin, unless it can be demonstrated that a higher level of ecological functions would result from an alternative approach. Compensatory mitigation proposals should meet stringent standards. The failure of mitigation projects is often attributed to inadequate planning, poor site selection and insufficient information on the critical environmental variables at a mitigation site. Mitigation plans must be required to guide such projects. Ecology has published guidelines for developing freshwater wetlands mitigation plans (Ecology, 1994; in review 2004).

Whether done for wetlands or other types of fish and wildlife habitat, mitigation plans prepared by project applicants should to be subject to review by appropriate agencies (e.g., Ecology or WDFW). Mitigation will usually require an area ratio that is greater than 1:1 to ensure that there is a full replacement of both area and functions (i.e. to insure against probable failure). Local governments should use the mitigation ratios proposed by Ecology as a starting point for defining mitigation "equivalency" (Ecology, 1998).

Helpful Resource

2004 Draft Guidance on Wetland Mitigation in Washington State. Pub. #04-06-013a. In review: *www.ecy.wa.gov/biblio/0406013a.html*

Regional studies have raised significant questions about the validity of mitigation strategies as currently practiced, demonstrating that less than half of the wetland mitigation projects sampled to date are even partially successful (Ecology,2000; Mockler,1998).

Part 4: What Needs Protection: Habitat Types and Functions

The fish and wildlife habitat conservation areas defined in the OCD Guidelines ([WAC 365-190-080 (5)] include a number of distinct habitat elements or "types" that require consideration in order to meet the GMA requirement to identify and protect fish and wildlife habitat. The following sections discuss various habitat elements and ecological processes that are nested within these broad categories and explore their implications for a "low risk" conservation planning strategy.

Aquatic Habitat And "Waters Of The State "

"Waters of the State" includes all rivers and streams, wetlands, marine waters and lakes in the state. These water bodies are a specific habitat type to be considered under the OCD guidelines. Washington State is required under the Federal Clean Water Act to protect all waters of the state. This translates into protecting all "beneficial uses" associated with these waters, including "water quality for the protection and propagation of fish, shellfish and wildlife." The State is also required by federal law to "restore and maintain the chemical, physical, and biologic integrity of the nation's waters." This policy is carried forth through Washington's enabling legislation, the Water Pollution Control Act [RCW 90.48.010].

The following sub-sections discuss various types of aquatic habitats that are critical for fish and wildlife and should be identified and protected through policies and development regulations. First, some background on the watershed context for understanding "waters of the state."

A watershed stream network is made up of channel segments that can be classified based on some measure of their relative resource value. The most commonly used classification system is found in Washington's Forest Practices Rules [WAC 222-26-030]. This system separates streams into Types 1 through 5 based on their relative importance for fish, wildlife or human use. It is essential to recognize, however, that the entire stream network is interconnected, both physically and biologically, from headwaters to estuaries, and must therefore be managed as a whole. This integrated view of the stream system is embodied in a basic scientific principle known as the "River Continuum" concept (Vannote, 1980).

Water, sediment and organic materials are continuously routed through the stream network, which is also linked throughout by a natural progression of communities and ecological process. For example: fish usage changes with stream gradient; most stream breeding amphibians utilize non fish-bearing channel segments for reproduction; aquatic insect feeding groups shift proportionally from shredders to grazers to collectors moving downstream, and so on. Smaller, headwater streams are important to the quality of downstream habitat because they carry materials such as water, sediment, nutrients, organic matter, and woody debris from the upper watershed to downstream areas. These streams, and their associated riparian areas, also have important habitat values (e.g. for stream associated amphibians and riparian wildlife).

Organic inputs from upstream riparian forest provide an extremely important energy source for down-stream aquatic communities (Bisson, 1998). In addition, approximately half of the large woody debris found at any given site —so critical in forming fish habitat—comes from upstream sources. Small, non-fish bearing streams account for over one-half the total channel length in many watersheds. These streams are critical to the productivity of downstream reaches, and are referred to in the scientific literature as the "backbone of salmon habitat" and "food pipes that subsidize downstream food webs" (USDA, 2001). Therefore, land use planning designed to protect aquatic habitat should address the entire channel network as an integrated system and protect functions and processes associated with all channel segments.

(a) Frequently Flooded Areas

This is the GMA term of art for floodplains. Floodplains are relatively flat areas adjacent to larger, low-gradient streams and rivers that are periodically inundated during high flows. In a natural state, they

allow for the lateral movement of the main channel and provide storage for floodwaters, sediment, and large woody debris. Floodplains generally contain numerous sloughs, side channels, and other features that provide important spawning and rearing habitat for fish and refuge areas during high flows (Abbe, 1996). Juvenile salmon typically feed in the shallows and seek cover from predators in deeper water or in woody debris complexes and emergent vegetation. Periodic flooding of the riparian zone encourages the exchange of water, nutrients, sediments, and energy between the river channel and the riparian zone. This exchange creates unique habitats, enhances natural productivity, and drives biological processes that contribute to the ecological complexity and integrity of stream systems (Poff, 1997; Ward, 1998; Bolton, 2001). Floodplain forests are highly productive habitats for wildlife, and studies show that the habitat complexity that results from natural disturbance within floodplain forests is a major factor affecting their quality as habitat for wildlife (Hanley, 1999).

While floodplains are potentially hazardous areas for development due to flooding and erosion, fish and wildlife depend on the habitat created when a river is allowed to migrate and overflow its banks. Protection for floodplain functions goes beyond protecting mere physical habitat elements to include the processes that create and maintain that habitat. Natural floodplains, channel migration zones and associated riparian wetlands, are critical components of a properly functioning aquatic ecosystem. Local governments should include regulatory standards for "frequently flooded areas" that will protect fish and wildlife habitat functions. The Federal Emergency Management Agency has developed a model ordinance that incorporates regulatory language that seeks to better balance floodplain development and maintenance of natural functions of floodplains (FEMA, 2001).

(b) Channel Migration Zones

The channel migration zone (CMZ) is the area where the active channel of a stream is prone to move over a given timeframe (usually stated as 100 years). Channel migration zones are associated with only a small percentage of the entire stream network length; however, protection for CMZ functions is critical to reduce flood hazards and habitat loss, and to avoid the need for future shoreline stabilization. The process of lateral channel migration is important for the creation and maintenance of floodplain habitat complexity. This complexity, in turn, directly influences important instream dynamics (e.g., nutrient cycles, floodwater storage, and water temperature) and enhances biological diversity (Abbe, 1996).

(c) Hyporheic Zones

The hyporheic zone is the area of saturated sediments beneath and adjacent to streams and rivers where surface and groundwater mixes. This zone can extend for considerable distance (even miles) across the width of the flood plain and extend many yards beneath the surface, linking rivers and floodplains with adjacent riparian zones. The hyporheic zone plays a very important role in maintaining the health and productivity of the freshwater aquatic system. It provides extensive intergraval habitat for aquatic invertebrates. During droughts and high-flow events, the hyporheic zone serves as a refuge, and is capable of re-supplying the invertebrate population of a streambed once instream conditions improve. It is also very important for nutrient cycling between riparian and stream environments. Disruptions to the hyporheic zone can negatively impact water flow, temperature, nutrient supply, and water quality. Therefore, development in floodplains should be conditioned to avoid interruption of ground water exchange and recharge of hyporheic zones.

(d) Wetlands

Wetlands, including marshes, bogs, and swamps, provide important habitat for both fish and wildlife. They provide essential habitats for feeding, nesting, cover, or breeding and are critical habitat for Washington's threatened and endangered species of wildlife (DNR, 1998). Numerous studies have shown that wetlands and associated riparian areas are utilized by a large percentage of wildlife species (Brown, 1985; Castelle, 1992; Mitsch, 1993).

Wetlands are also vital nursery and feeding areas for anadromous fish such as salmon and steelhead trout (WDFW, undated; NOAA, undated). Riverine associated wetlands help maintain channel habitat and provide refuge from both high and low stream flows. Wetland groundwater inputs to streams provide

thermal refuge areas important for cold-water fish species such as trout, steelhead and salmon.

It is estimated that 30 percent of Washington's wetlands have been lost since settlement and losses continue at an alarming rate (as much as 2,000 wetland acres annually). Urbanized wetlands in Puget Sound have suffered losses ranging from 90 to 98 percent. Seventy percent of tidally influenced wetlands in the same region have been lost from diking, dredging, and filling. Most of the State's remaining wetlands have been significantly degraded (Ecology, 2000).

Most local governments rely on Ecology's wetland rating system for grouping wetlands into one of four categories based on wetland size and vegetation classes, sensitivity to disturbance, whether they can be easily replaced, the presence of threatened and endangered species, etc. (Ecology, 1991 and 1993). This method is then used as the basis for establishing protection standards by setting buffer requirements for wetlands. However, Ecology's approach tends to undervalue smaller, structurally simpler wetlands that nonetheless have important value for wildlife species that are less mobile than mammals or birds—such as amphibians, and aquatic insects—and specialized wetland plants. Studies have shown that small wetlands act as critical population sources for amphibians (Richter, 1997). To address this problem, criteria for designating and protecting wetland habitats of "local significance" can be developed by local governments, consistent with OCD guidelines.

Ecology will revise its wetland rating system. The current rating systems emphasize habitat values but largely ignore the water quality/quantity functions of wetlands. This deficiency is especially notable in urban wetlands where water quality functions have been traded for habitat structure that may be relatively useless in an isolated and degraded environment. Citizens and planners should use Ecology's new rating system once it is available.

Helpful Resource

Ecology's Best Available Science for Freshwater Wetlands *www.ecy.wa.gov/programs/sea/bas_wetlands/index.html*

(e) Riparian Habitat

Riparian habitat is the area adjacent to water (i.e., wetland, stream, lake, and estuarine-marine shorelines) that contains elements of both aquatic and upland habitats that mutually influence each other. Riparian areas provide important wildlife habitat. They provide sites for foraging, breeding and nesting; cover to escape predators or weather; and corridors that connect different parts of a watershed for dispersal and migration. Approximately 85 percent of Washington's wildlife use riparian habitat for essential life activities (Knutson, 1997). The riparian zone includes the area that begins at the channel or estuarine-marine shoreline edge and extends to that portion of the upland environment that directly influences the aquatic ecosystem by providing shade, fine or large woody material, nutrients, organic debris, sediment filtration, terrestrial insects, and habitat for riparian-associated wildlife.

Riparian habitat includes the entire extent of the riverine floodplain because that area significantly influences and is influenced by the stream system during flood events.

Riparian vegetation plays a vital role in maintaining aquatic habitats. Riparian trees introduced into stream channels through bank cutting, windfall and natural mortality are the source of large instream woody debris. This process is a primary factor creating the pools, riffles and side channels that are essential habitat for many fish and other aquatic species. When large woody debris is trapped within side channels, it functions to minimize bank erosion, dissipate channel energy, regulate flow down the side channels, create localized rearing and flood refuge areas, and contribute to the stabilization of the main river channel (Abbe, 1996). The quantity of woody debris in stream channels has decreased over time as a result of various land use practices, including clearing of riparian trees.

Riparian vegetation is extremely important for terrestrial wildlife species. Approximately 29 percent of wildlife species found in riparian forests in the coastal zone extending from northern California into southeastern Alaska are riparian obligates, a category that includes those species that depend absolutely on riparian and aquatic resources for their essential needs. Within this zone, 78 bird species are

classed as riparian obligates. This represents about one third of all bird species in the ecoregion (Kelsey & West, 1998). Riparian habitat is usually a narrow band and a relatively small portion of the land base. Because riparian habitat provides for high biological diversity on such a small fraction of the landscape, it is extremely important to protect. The WDFW estimates that, since the arrival of settlers in the early 1800s, at least 50 percent and as much as 90 percent of riparian habitat in Washington has been lost or extensively modified (Knutson, 1997).

Historically, buffers were only required on streams that provide habitat for fish and are important for domestic water supplies. In fact, non-fish-bearing stream segments make up the majority of the stream network. They play a crucial role in maintaining downstream water quality and habitat and provide habitat for localized non-fish aquatic communities as well as upland wildlife species. Thus, Critical Area Ordinances should include buffers capable of providing these functions. Of equal importance to the width or extent of the riparian corridor is the quality of the riparian area in terms of vegetation type, species diversity, physical condition, and maturity. Ideally, the riparian corridor in a developed watershed should mirror that found in the natural ecosystems of that region. Research shows that streams with a high level of riparian integrity—including appropriate width, structure, composition and spatial connectivity—have greater potential for preserving ecological integrity (Horner and May, 1999).

Numeric standards for riparian buffer widths needed to protect specific riparian functions have largely been defined in the scientific literature (e.g., Knutson, 1997; Spence, 1996).

(f) Marine Habitats

The Puget Sound estuary supports over 200 species of fishes, approximately 10 species of marine mammals, hundreds of species of aquatic invertebrates and plants, and is critical to the survival of shorebirds, waterfowl, and upland wildlife species. Yet shoreline modifications in this region (piers and docks, shoreline armoring, dredging and filling), contamination and resource exploitation have all contributed to major losses of habitat area and species declines in the region. The most recent indicators of impacts to marine resources include the ESA listings of Puget Sound chinook salmon, Eastern Strait of Juan de Fuca/Hood Canal summer chum salmon, and petitions to list Orca whales and 18 other marine fishes.

By protecting marine shorelines and the nearshore zone we protect eelgrass, salmon, Orcas and all the species that depend on this web of life. All the different aspects of the system are connected. As nearshore habitats are harmed, species like eelgrass are threatened. When eelgrass is harmed, salmon that rear in the shallow nearshore habitats are placed at risk for predation; herring, an important food source for salmon and other marine life forms, use eelgrass meadows for spawning and their populations may therefore be diminished; this can all lead to reduced salmon populations, which in turn can lead to stressed and hungry Orcas.

The terms "nearshore" and "estuarine" together comprise a diverse and complex array of shoreline-associated habitats with saltwater (marine) influence. Categories of nearshore habitat include the riparian, backshore, intertidal, and shallow subtidal zones. Within this zone a diverse array of discrete habitats can be found: salt marshes, rock-gravel and sand beaches, mudflats, kelp beds, unvegetated sub-tidal and algae and eelgrass inter-tidal areas. (Williams and Thom, 2001).

The nearshore zone extends waterward from shorelines to include the tidal and subtidal zone where adequate sunlight penetrates to fuel plant photosynthesis (approximately 60 feet below the mean low water level), and extends landward to include coastal landforms such as the backshore, sandspits, coastal bluffs, coastal wetlands, and the riparian zones on or adjacent to these areas.

Estuaries are transition zones between rivers and saltwater, including the tidally-influenced portions of river and stream mouths, and are one of the most productive aquatic environments. Because estuaries have abundant food supplies and a wide salinity gradient, they are particularly valuable to anadromous fish (salmon, steelhead and trout) for rearing, feeding, and completing the biological transition between fresh water and marine habitats. The vital role that estuaries play in chum and chinook salmon ecology is a basic tenet of salmon biology. Nearshore habitats

The life cycle of Puget Sound salmon begins in the freshwater, takes them through estuaries, along the shoreline areas between estuaries, and into the marine waters of Puget Sound and the Pacific Ocean before they return to their natal streams. The viability of future Puget Sound salmon populations will depend, in part, on our commitments to protecting and, if needed, restoring all of these areas.

serve as a bridge between widely dispersed estuarine delta areas and provide productive, protected migratory corridors for salmon, forage fish (herring, sand lance and surf smelt) and many other aquatic species; consequently, one must expand beyond the watershed perspective when considering marine and anadromous fish life history requirements that span linkages across terrestrial landscapes and marine/oceanic ecosystems (Brennan & Culverwell, 2004; Simenstad, 1998).

Marine riparian areas, like their freshwater counterparts, stabilize banks and control sediment inputs from surface erosion; filter pollutants and help to regulate freshwater delivery to marine environments; contribute large and small organic matter important for habitat structure and marine food chains (including terrestrial insects important to juvenile salmon); and provide shade to intertidal beaches important for forage fish spawning (Pentilla, 2002).

Marine riparian vegetation has significant habitat value. Marine riparian trees provide perching and nesting habitat for many species of wildlife, including bald eagles, osprey, and other raptors and birds. In their review of the 331 wildlife species known to inhabit all of King County, Brennan and Culverwell (2004) identified 252 wildlife species (9 amphibians; 5 reptiles; 193 birds; 45 mammals) known or expected to have an association with riparian habitat on marine shorelines in Puget Sound. Terrestrial insects make up a large component of juvenile chinook diets in the nearshore, which suggests the importance of shoreline vegetation as a production source (Brennan & Higgins, 2004). See figure on next page for a conceptual model of marine riparian functions.

Helpful Resources

Explanation of shoreline dynamics: *www.ecy.wa.gov/programs/sea/pugetsound/bluffs/drift.html*
http://pubs.usgs.gov/circ/c1075/change.html

Northwest Straits Commission Conservation Initiative *www.nwstraits.org/*

Puget Sound Action Team guidance for nearshore and marine aspects of salmon recovery planning *www.psat.wa.gov/Publications/salmon_recovery/index.htm*

2003 Georgia Basin/Puget Sound Research Conference Proceedings *www.psat.wa.gov/Publications/03_proceedings/rc_files/oral.htm*

Ecology's Digital Coastal Atlas *www.ecy.wa.gov/programs/sea/SMA/atlas_home.html*

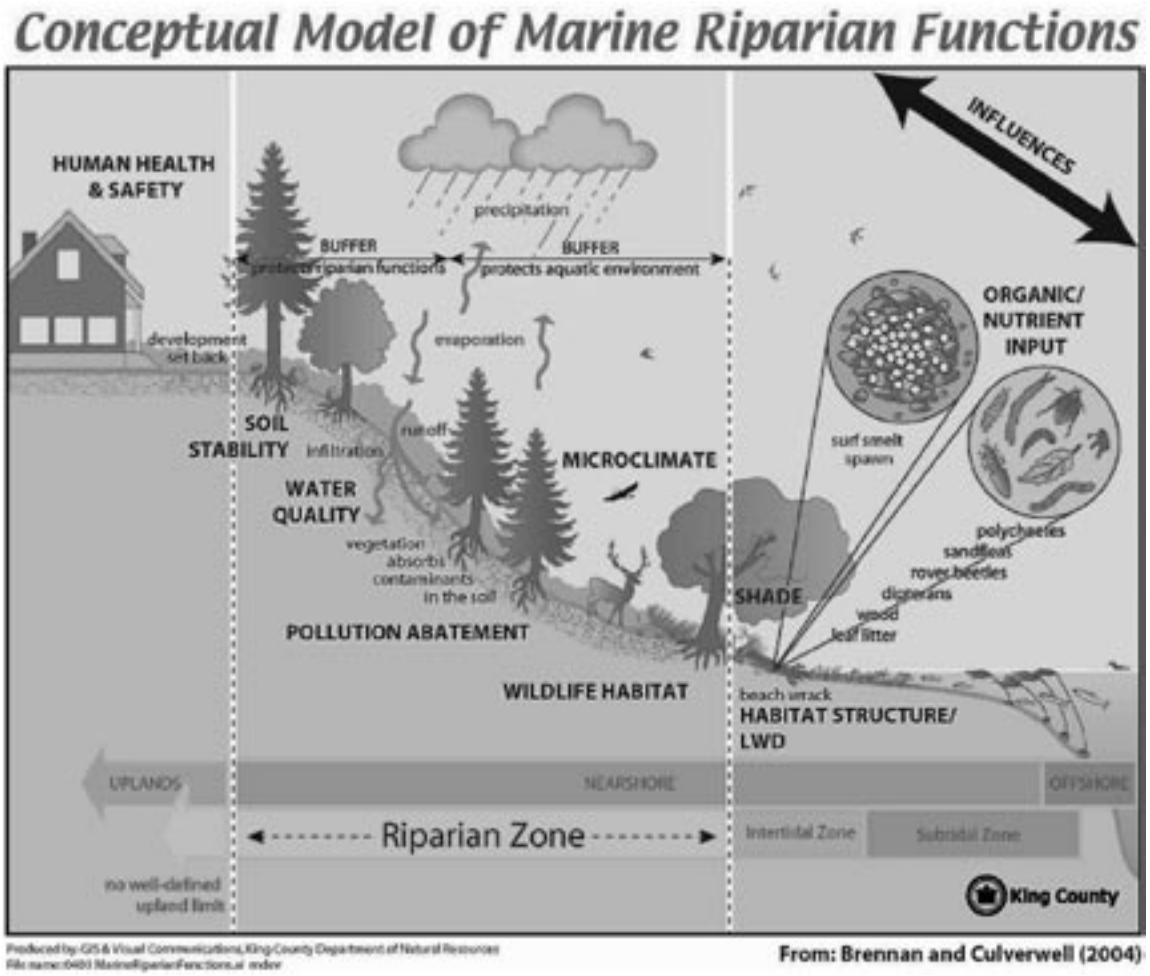
Aquatic Habitat Guidelines: An Integrated Approach to Marine, Freshwater, and Riparian Habitat Protection and Restoration *www.wdfw.wa.gov/hab/ahg/*

For information on shoreline modifications, see the Department of Fish and Wildlife's Aquatic Habitat Guidelines white paper *http://wdfw.wa.gov/hab/ahg/marnrsrc.htm*

Resources to protect shellfish through critical areas or natural resource lands designations *www.psat.wa.gov/Programs/shellfish/Resources_CAO_03.pdf*

Guiding ecological principles for nearshore restoration *www.pugetsoundnearshore.org/*

Nearshore habitats include the shallow water zone and the upland area immediately adjacent to shorelines. The upland area within 200 feet landward of the ordinary high water mark falls within the jurisdiction of the state Shoreline Management Act and is included in our use of the term nearshore.



From: Brennan and Culverwell (2004)

Policies for protection of forage fish spawning sites should include identification and regulation of feeder bluffs that provide sediment that maintains the beach habitat on which these species rely. This may include measures such as setbacks, marine riparian buffers, and restrictions on bulkheads (PSAT, 2004).

Just as watersheds delineate the boundary of a river system, drift cells (or littoral cells) provide natural units for shoreline management (Bauer, 1978; Terich, 1991; Best, 2003). Individual drift cells are defined by the local extent of longshore sediment transport and delineate the boundary of discreet beach-sediment systems. Each drift cell consists of three components: a feeder bluff that supplies sediment, a transport zone within which wave action moves that sediment along shore, and a deposition area which terminates the drift cell and where sediments accrete, replenishing beaches and forming typical shoreline landforms such as tidal flats and spits. The natural variability of wave action interacting with the irregular shape of the shoreline results in a multiplicity of discrete drift cells ranging in size from a few hundred yards to a mile or more in length (Downing, 1983; Finlayson, 2003).

Over 120 distinct drift cells have been mapped along Hood Canal and the eastern Strait of Juan de Fuca alone and a recent survey of shoreline modifications in this same area revealed that almost 20 percent of the shoreline was "hardened" with bulkheads. In addition, a total of 486 docks, 408 stairs, 118 rail launches, 128 launch ramps and 30 jetties/groins were identified. The study explores the complex interactions between human development patterns and shoreline erosion processes, and clearly demonstrates that shoreline management needs to consider not just localized impacts from shoreline modifications, but also drift-cell-wide impacts (Labbe, 2003).

The concept of drift cell management suggests shoreline uses should be regulated based on the recognition that sediment transport is an ecosystem-wide process that does not recognize property or jurisdictional boundaries and actions that affect the delivery or transport of sediment may affect beaches elsewhere.

Upland Wildlife Habitat

Upland wildlife habitat includes primary habitats (i.e., "core areas") associated with terrestrial species, and land essential for preserving connections between habitat blocks (i.e., "corridors").

"The failure of the County to also include species of local importance results in noncompliance with the Act." Clark County Natural Resource Council, et al. v. Clark County, et al. WWGMHB #96-2-0017 (FDO 12-6-96) at 15.

Wildlife planning efforts have traditionally focused on individual species protection. This approach has led to piecemeal, inefficient and fragmented conservation efforts that ignore the broader systems that species depend upon for their survival. To effectively manage wildlife habitats to conserve biodiversity, habitat conservation planning must be expanded to larger spatial scales and will require integration of landscape concepts into planning and management (Hudson, 1991). Landscape ecologists use four basic terms to define spatial structure at a particular scale:

- Matrix: the land cover that is dominant and interconnected over the majority of the land surface.
- Patch: a nonlinear area that is less abundant than, and different from, the matrix.
- Corridor: a special type of patch that links other patches in the matrix. Typically, a corridor is linear or elongated in shape, such as a stream corridor.
- Mosaic, a collection of patches, none of which are dominant enough to be interconnected throughout the landscape.

Viewed at the landscape scale, a typical rural landscape in Washington might consist of a forest matrix with patches of clear-cuts, croplands and pasture, commercial and residential developments, lakes, wetlands and stream corridors. The GMA directs local governments to "identify open space corridors useful for recreation, wildlife habitat, trails, and connection of critical areas" [RCW 36.70A.160]. Wildlife corridors are needed to maintain connectivity, provide access to larger habitats and allow populations to interbreed. At the largest scale, wildlife corridors must be wide enough to allow easy movement for even the largest mammals. However, smaller wildlife corridors can provide habitat connectivity for other species, including amphibians, fish, and birds. Continuous riparian corridors provide both aquatic and terrestrial connectivity. In urban areas, such corridors will provide significant recreational opportunities and important linkages in a highly fragmented landscape. Whenever possible, urban and rural parks and open spaces should be linked to form functional wildlife corridors, which can then be ultimately joined to outlying habitat patches. Countywide GMA planning provides the principle regulatory mechanism (e.g. zoning and development regulations) for implementing a state biodiversity conservation strategy and complementing non-regulatory approaches such as conservation easements, land acquisition and tax incentives.

The WDFW Priority Habitats and Species Program (PHS) provides a range of tools that can be used by local governments for making land use decisions, including maps and reports that answer the most common questions regarding fish and wildlife species. PHS also identifies fish and wildlife resources that are considered a priority for management and conservation. Importantly, the OCD guidelines direct counties and cities to classify and designate "locally important habitat and species" [WAC 365-190- 080 (5)]. This category can include species and habitats that are locally rare, even though they may be abundant in other regions of the state, which make an important contribution to local biodiversity.

In one case the Hearings Board found, "The failure of the County to also include species of local importance results in noncompliance with the Act." (Clark County Natural Resource Council, et al. v. Clark County, et. al. WWGMHB #96-2-0017 FDO, 12-6-96 at 15). These areas will often not be covered by state and federal sensitive species protections, so processes

for identifying and designating these species and habitats of local importance are necessary to reverse wildlife losses. In addition local governments have authority under the GMA to broaden the basis for habitat protection from only state-identified PHS species and habitats to include areas of high species richness, to designate and protect corridors to connect these habitats, and to use its regulatory authority under the GMA to protect the integrity of these designations.

Local governments can also use "open space" property tax valuation as a policy tool with which to address broader habitat protection goals. Washington State's Open Space Taxation Act [RCW 84.32) provides for implementing a "Public Benefit Rating System" that can encourage environmentally sensitive land uses and planning and require site-specific approved plans. The incentive for the landowner is that they receive a reduced tax rate on the land. The statute also authorizes a "conservation futures" tax valuation provision that local governments can use to fund land acquisition for this habitat protection (Ecology, 1999).

Just as we need to connect habitats, we also need to develop linkages among resource managers to promote a more holistic approach for achieving biodiversity conservation. Some recent developments provide hope that Washington is moving in this direction. The 2002 legislature passed a "Biodiversity Conservation" bill [ESSB 6400] directing the development of a statewide biodiversity conservation strategy to "replace existing single-species or single-resource protection programs." A task force has now developed recommendations to implement this approach (IAC, 2003). Hopefully, this will help shape conservation efforts in the future. In addition, the Washington Chapter of The Nature Conservancy is carrying out statewide "Ecoregion Conservation Planning" (ECP) while WDFW has launched an ECP pilot project that is focused on the Kitsap Peninsula and Kitsap County "alternative futures" planning for the Chico Watershed.

Photo by Jerry Gorsline

Helpful Resources

"The Protection Of Wildlife Under Washington's Growth Management Act." Alan D. Copsey. U. Puget Sound L. Rev. 1101 Spring, 1993

WDFW Priority Habitats and Species Program: *http://wdfw.wa.gov/hab/phspage.htm*

Friends and Advocates of Urban Natural Areas: *www.urbanfauna.org/*

Stormwater Management – An Emerging Challenge

During the 1990's, it was revealed that dramatic declines in aquatic life and especially anadromous fish resulted from stormwater runoff. Information derived from studies in the Puget Sound region showed remarkably clear trends in aquatic-system degradation. Stormwater investigators have found that measures of aquatic insect composition and abundance, channel structure, hydrology, and habitat for salmon all degrade as the relative area of impervious surface increases in a watershed (CWP, 2003).

Stormwater runoff is largely generated by impervious surface. Impervious surfaces are those which water cannot penetrate, such as paving, rooftops, and roads and other structures. However, replacing native vegetation with grass lawns will also generate stormwater runoff by reducing the soil infiltration rate.

Stormwater runoff is a fundamental threat to freshwater habitat because it leads to unnaturally high stream flows during rainy periods and unnaturally low stream flows during dry times.

The GMA specifically requires counties and cities to address stormwater runoff as part of their land use regulations [RCW 36.70A.070(1)]. In its Statewide Strategy to Recover Salmon: Extinction is Not an Option (GSRO, 1999), the State of Washington identified stormwater runoff as a major factor in the degradation of salmon streams in developed areas.

While stormwater management doesn't fit neatly into any Critical Areas category, it remains a fundamental threat to freshwater and marine habitats.

Watershed and riparian characteristics determine aquatic habitat conditions, and the adverse effects of watershed urbanization on water resources are well documented by studies conducted in lowland salmon spawning and rearing streams in the Puget Sound region (CWP, 2003; Booth, 2000; Horner, 1999; May, 1997).

Twenty years of studies in western Washington watersheds have demonstrated a strong correlation between losses of forest cover, changes in hydrology, and resulting stream degradation. The same studies reveal that in western Washington, and likely in other humid regions as well, approximately 10 percent effective impervious area in a watershed typically results in measurable stream habitat degradation. In addition, widespread conversion of forest to pasture or grass in rural areas can alter runoff patterns and degrade aquatic systems even when urbanization remains low in the watershed at large.‰ This phenomenon of loss of native vegetation and increased impervious surface is often referred to in shorthand as "65/10" (i.e., the need to retain 65% of native vegetation and limit impervious surfaces to 10% in a watershed to maintain stream health).

Hydrologic processes dominate the formation and functioning of aquatic habitat. The loss of natural vegetation in riparian and upland areas and its replacement with impervious surfaces alters watershed hydrology, resulting in degraded fish habitat. Increased stormwater runoff causes rainwater to reach streams faster and in larger volumes, which in turn causes more frequent and severe flooding and erosion. Stormwater also washes off pollutants from roads, parking lots and farmlands and carries these contaminants to streams and eventually to marine waters. Stormwater runoff in urbanized watersheds has been known to increase stream peak flows as much as five-fold over natural conditions. Also, because less stormwater soaks into the ground, summer flows are lowered, leading to high water temperatures, concentration of pollutants, and lower dissolved oxygen levels. Ground water supplies, an important source of drinking water in many areas, may also be negatively impacted.

For twenty years, city governments have pursued engineering approaches in an effort to protect aquatic resources from the cumulative effects of urbanization, yet these structural practices, such as stormwater detention ponds, have proven inadequate to prevent damage to aquatic habitat resulting from stormwater runoff (Beyerlein, 1998).

At a minimum, local governments should adopt and implement stormwater regulations equivalent to Ecology's stormwater manual for their region. However, the Ecology manual, by its own admission, is not sufficient to protect aquatic habitat:

> Ecology understands that despite the application of appropriate practices and technologies identified in this manual, some degradation of urban and suburban receiving waters will continue, and some beneficial uses will continue to be impaired or lost due to new development. This is because land development, as practiced today, is incompatible with the achievement of sustainable ecosystems. Unless development methods are adopted that cause significantly less disruption of the hydrologic cycle, the cycle of new development followed by beneficial use impairments will continue…a dramatic reduction is necessary in the amount of impervious surfaces and artificially landscaped areas to accommodate our preferred housing, play, and work environments, and most significantly, our transportation choices (Ecology, 2001).

The Manual does acknowledge that "[r]eduction of flows through infiltration decreases stream channel erosion and helps to maintain base flow throughout the summer months" and offers the option of "full dispersion" best management practices (see BMP, T5.30, Vol 5).

In its review of the Ecology stormwater manual, the Governor's Independent Science Panel noted:

> The project area approach presented in the manual is a necessary first step in dealing with potential downstream channel stability and water quality problems at the source. Ultimately, however, a larger watershed-scale perspective is also needed in order to assure that desired goals are met in concert with all of the other land uses and downstream water issues, including salmon. This expanded perspective could be attained by bolstering incorporation of stormwater management into watershed-scale assessment and planning activities...We stress that watershed-scale planning is needed to effectively coordinate the objectives of stormwater management and other beneficial uses of water and streams (ISP, 2003).

Through SMPs and CAOs, local governments will need to address the larger-scale, cumulative effects of stormwater by setting standards for the development and redevelopment of land. It has become quite clear that the protection of aquatic resources in developing areas will require an integrated approach that includes the following: setting thresholds for impervious-surface and forest-retention; protecting riparian buffers, wetlands and unstable slopes; and, project-level detention ponds and water quality treatment.

Local governments must address stormwater management issues by setting new standards for the development and redevelopment of land. Ordinances should ensure retention of 65% of native vegetation and limit impervious surfaces to 10% in the watershed.

A comprehensive approach to stormwater management must also require use of "low impact development" (LID) techniques that infiltrate runoff on-site where feasible rather than collecting, conveying and discharging stormwater off-site. As an example, the City of Tumwater recently adopted a Zero Effect Drainage Discharge Ordinance (City of Tumwater, 2002) authorizing new performance standards for

development designed to "dramatically reduce additional stormwater flow to streams and wetlands in order to enhance the aquatic environment and anadromous fisheries." It is important to also note that LID techniques can *lower* development costs by reducing land clearing and grading, pavement, and the need for conventional stormwater conveyance and collection systems (NAHB, 2003).

In order to meet the GMA requirement to "include the best available science in developing policies and development regulations to protect the functions and values of critical areas," and to "give special consideration to conservation or protection measures necessary to preserve or enhance anadromous fisheries" [RCW 36.70A.172(1)], stormwater regulations must incorporate adaptive management provisions to address loss of forest cover and cumulative increases to total impervious area at the landscape scale. This will require that the county monitor and restrict the total impervious area that is being permitted at the watershed, sub-basin and project scale.

A precautionary approach for protecting water resources and fish and wildlife habitat will require conservative forest cover and impervious surface thresholds (e.g. precautionary trigger levels of 6% total impervious area and minimum retention of 65% native vegetative cover) at both the landscape and the local (lot area) scale. Approaching landscape thresholds should trigger assessments of the effectiveness of stormwater management regulations in protecting aquatic habitat.

Helpful Resources

Instream Flow Tool Kit: An Advocacy Guide to Healthy River and Stream Flows in Washington
Prepared by WEC and American Rivers
www.wecprotects.org/streams/streamflowtoolkit_home.cfm

Ecology Stormwater Manual
www.ecy.wa.gov/programs/wq/stormwater/manual.html

Low Impact Development (LID) Center, a non-profit organization balancing growth and environmental integrity:
http://lowimpactdevelopment.org/

Center for Watershed Protection
www.cwp.org/

Examples of LID ordinances and regulations:
www.psat.wa.gov/Programs/LID/LID_ordinances.htm

City of Seattle's Natural Drainage Systems program:
www.ci.seattle.wa.us/util/NaturalSystems/default.htm.

WEC Checklist For Reviewing Development Regulations To Protect Fish And Wildlife Habitat

The following checklist poses 56 questions regarding vital facets of fish and wildlife habitat protection. The objective of the checklist is to provide an analytical tool to generally determine the adequacy of existing or proposed development and use regulations authorized by Washington's principle land use and shoreline laws. The answers will generally be "yes" or "no." A "yes" will reflect a positive sign for protection, while a "no" will reflect a problem with respect to the regulations.

While the questions are generally self-explanatory, if you wish to find out more about the background and rationale for questions please go to: www.wecprotects.org/habitat/habitattoolkit.cfm

1. General Provisions	Yes	No
1) Is there a clear statement of purpose for land use planning to protect fish and wildlife habitat (e.g., "suitable habitats to maintain native fish and wildlife species within their natural geographic distribution so that isolated subpopulations are not created")?		
2) Is there a statement to the effect that no land use action will result in a net loss of critical area functions and that any adverse impacts resulting from a development proposal shall be fully mitigated?		
3) Are mitigation actions defined in the preferred sequence (i.e., avoid, minimize, compensate, monitor)?		
4) When mitigation is required, is a mitigation plan required that includes monitoring?		
5) Is there a statement that all land uses and activities within 300 feet of Critical Areas and their associated buffers are subject to the requirements of the critical areas ordinance?		
6) Are exemptions sufficiently limited to prevent harm to Critical Areas?		
7) Are allowed activities in Critical Areas or their buffers consistent with purpose to protect critical area structure and functions?		
8) Are variances to Critical Area protection standards subject to public hearing and notice requirements?		
9) If there is a "reasonable economic use" variance to avoid property takings and compensation claims, is there a public notice and hearing requirement to determine that the standard development regulations would deny all reasonable use of the property and that any variance will result in the minimum feasible impact to any Critical Areas?		
10) Will a record of notice be placed on the title of property affected by a designated Critical Area?		
11) Will boundaries of a Critical Area and its buffer be clearly marked prior to construction activities?		
12) Does the development code include enforcement provisions, including use of both civil and criminal penalties, to ensure compliance with Critical Area performance standards?		
13) Is a building setback of at least 15 feet required from the edge of any buffer?		
14) Does the CAO require coordination with watershed, salmon recovery and instream flow programs?		

2. Fish and Wildlife Habitat Conservation Areas (FWHCA)	Yes	No
15) Are Habitat Management Plans or Mitigation Plans required when proposals have the potential to impact Fish and Wildlife Habitat Consevation Area functions?		
16) Do the regulations apply to ponds and lakes less than 20 acres?		
17) Do the regulations apply to all Waters of the State? (e.g., those waters that meet the criteria for Type 1-5 streams as set forth in WAC 222)		
18) Does the ordinance designate and protect State Priority Habitats and Species (PHS) found within the local government jurisdiction including state and federal endangered, threatened and sensitive species ?		
19) Are riparian buffers required to be maintained in natural condition?		
20) Does the local government require that Washington Department of Fish and Wildlife (WDFW) management recommendations for PHS serve as the basis for Habitat Management Plans?		
21) Do the regulations protect habitats and species of local importance and include process for designating them?		
22) Do the standard riparian buffer widths conform to WDFW PHS Program recommendations?		
23) Are FWHCA stream buffer widths measured from the outer margin of the channel migration zone when present?		
24) Do FWHCA stream buffer widths extend to the edge of the 100-year floodplain?		
25) Does the ordinance limit buffer averaging so that the total buffer area is no less than that contained within the standard buffer, the buffer width is not reduced by more than 50 percent of the standard buffer, and will not be less than 50 feet from the ordinary high water mark or outer margin of the channel migration zone when present?		
26) Are limitations placed on stream bank stabilization?		

3. Wetlands	Yes	No
27) Do the regulations use the Washington State Wetlands Identification and Delineation Manual to designate wetlands and their boundaries?		
28) Do the regulations adopt the Washington State Wetlands Rating System for Eastern or Western Washington as the rating system for jurisdiction wetlands?		
29) Do the standard wetland buffer widths conform to Office of Community Development (OCD) Model Code Provisions?		
30) Is there a provision for expanding wetland buffers when necessary to protect wetland structure and functions based on site-specific characteristics?		
31) Are wetland buffers required to be maintained in natural condition?		
32) Does the ordinance limit buffer averaging so that the total buffer area is no less than that contained within the standard buffer, the buffer width is not reduced by more than 50 percent of the standard buffer, and will not be less than 50 feet from the wetland edge?		
33) Are replacement ratios for compensatory mitigation consistent with OCD Model Code Provisions?		
34) Are there guidelines to locate wetland mitigation sites in the same sub-basin except for special situations justified by a wetland mitigation plan?		
35) Can replacement ratios be increased based upon factors such as risk of failure, timing, reduced functions or code violations?		
36) Does the ordinance designate all wetlands, regardless of size?		

4. Stormwater	Yes	No
37) Does the Stormwater Ordinance adopt Ecology's Stormwater Management Manual?		
38) Does the local government have ordinances to ensure retention of 65% of native vegetation and limit impervious surfaces to 10% in the watershed?		
39) Does the Development Code include regulations that require low impact development stormwater measures that treat and infiltrate stormwater on site?		
40) Does the local government have a development code to enable implementation of the Ecology "full dispersion" option? [Stormwater Manual BMP T5.30, Vol. 5]		
41) Has the local government adopted a clearing and grading ordinance? Does it incorporate low impact development standards to reduce stormwater runoff?		
42) Does the Puget Sound jurisdiction adopt the stormwater program elements in the 2000 Puget Sound Management Plan?		

5. Shoreline Master Programs	Yes	No
43) Does the Shoreline Master Program (SMP) include a statement to the effect that no shoreline use will result in a net loss of shoreline ecological functions? [WAC 173-26-186(8)(b)]		
44) Is there a statement to the effect that the SMP is designed to achieve overall improvements in shoreline ecological functions over time when compared to the status upon adoption of the master program? [WAC 173-26-186(8)(c)]		
45) Does the SMP evaluate and consider cumulative impacts on shoreline ecological functions and contain policies, programs, and regulations that address adverse cumulative effects? [WAC 173-26-201(3)(d)(iii)]		
46) Does the SMP include a plan for restoration of impaired shoreline ecological functions that includes identifying opportunities, timelines and benchmarks? [WAC 173-26-201(f)]		
47) Does the Critical Areas Ordinance (CAO) designate kelp beds, eelgrass beds, spawning and holding areas for forage fish? [WAC 173-26-221(2)(c)(iii)(A)]		
48) Does the SMP determine allowable uses in the prescribed order of preference, beginning with reserving appropriate areas for protecting and restoring ecological functions to control pollution and prevent damage to the natural environment and public health? [WAC 173-26-201(2)(d)]		
49) Does the SMP provide protection of comparable Critical Areas including buffers that are at least equal to the protection provided by the CAO? [WAC 173-26-221(2)(a)(ii)]		
50) Does the Agricultural Lands Ordinance designate shellfish beds as agricultural lands of long-term commercial significance?		
51) Does the CAO or SMP designate feeder bluffs as Critical Areas for maintaining forage fish spawning habitat where sediment from the feeder bluffs nourishes such habitat?		
52) Does the CAO designate shellfish beds as critical fish and wildlife habitat areas?		
53) Does the SMP require coordination of mitigation plans with watershed, salmon recovery, and in-stream flow programs?		
54) Does the SMP require management plans for critical saltwater habitats are consistent with the inter-agency Aquatic Habitat Guidelines for fish and wildlife conservation areas?		
55) Does the SMP include provisions for mitigation measures and methods to address unanticipated impacts, including the sequencing of measures as per SEPA and the SMP guidelines? [173-26–201(2)(c) and (e)]		
56) Does the SMP strictly limit shoreline modifications? [173-26–231(3)(iii)]		
57) Does the SMP or a separate ordinance provide for the monitoring of the implementation of the SMP and enforcement of shorelines permits? [RCW 90.58.140(3) and 173-26-201(2)(b)]		

Appendix 1:

Acronyms used in text

BAS .....Best Available Science

CAO .....Critical Areas Ordinance

CTED.....Washington Office of Community Trade and Economic Development

CMZ.....Channel migration zone

FWHCA.....Fish and Wildlife Habitat Conservation Areas

GMA .....Growth Management Act

PHS.....Priority Habitats and Species

RHA .....Riparian Habitat Areas

SMA .....Shoreline Management Act

SMP .....Shoreline Master Program

WDFW .....Washington Department of Fish and Wildlife

Appendix 2

Additional sources of information

Washington Environmental Council
Web page will provide links for supplements and updates to this Guide: *www.wecprotects.org/habitat/habitattoolkit.cfm*

1000 Friends of Washington
Excellent source of expertise and support for citizens and groups working to manage growth in their communities: *www.1000friends.org*

American Planning Association
Offers a primer on wildlife and habitat protection planning: Habitat Protection Planning: Where the Wild Things Are: *www.planning.org/*

EPA
Information Sources page providing links to several valuable databases: *www.epa.gov/epahome/resource.htm*

Municipal Research and Services Center of Washington (MRSC)
Providing information and links pertaining to local governments: *www.mrsc.org*

People for Puget Sound, a non-profit citizens' group working to protect and restore the health of Puget Sound and the Northwest Straits through education and action: *www.pugetsound.org/*

References

1000 Friends of Washington. 2002. You Can Make a Difference! A Citizen's Guide to the 2002 Five-Year Review.

Abbe, Timothy B. and David R. Montgomery. Large Woody Debris Jams, Channel Hydraulics and Habitat Formation in Large Rivers. Regulated Rivers: Research & Management, Vol. 12, 201-221. 1996.

Angermeier, Paul L. and Names R. Karr. 1994. Biological Integrity versus Biological Diversity as Policy Directives. Bioscience, Vol. 44 No. 10.

Bauer, Wolf. 1978. Marine Shore Resource Analysis: Shoreline Dynamics. Report for Shoreline Environments of Puget Sound conference held October 30th, 1991 in Seattle. Washington Department of Ecology, Shoreline and Coastal Management Program. Olympia.

Best, Peter Namtvedt. Shoreline Management Areas: A Tool for shoreline ecosystem management. In Puget Sound Notes. Issue No. 47. September 2003. Puget Sound Action Team.

Beyerlein, D., and J. Brascher, 1998. Traditional alternatives: Will more detention work? In: Abstracts of Salmon In the City conference, May 20, 1998, American Public Works Association, Washington Chapter.

Bisson, P.A. et al. Organic Matter and Trophic Dynamics. Page 373-391 in Naiman, R.J. et al. 1998. River Ecology and Management. Springer.

Bolton, Susan, and Jeff Shellberg. 2001. *Ecological Issues in Floodplain and Riparian Corridors.* Prepared for the Aquatic Habitat Guidelines Steering Committee and jointly published by the Washington State departments of Ecology, Fish and Wildlife, and Transportation, Olympia. Also available in Adobe Acrobat© format at *www.wa.gov/wdfw/hab/ahg/floodrip.htm*

Booth, Derek B. Forest Cover, Impervious-Surface Area, And The Mitigation of Urbanization Impacts In King County, Washington. 2000.

Brennan, J.S. and H. Culverwell. 2004 (in review). Marine Riparian: An assessment of riparian functions in marine ecosystems. Puget Sound Water Quality Action Team, Olympia, Washington. 47pp.

Brennan, J.S. and K.F. Higgins. 2004 (in review). Juvenile salmonid composition, timing, distribution, and diet in marine nearshore waters of WRIAs 8 and 9 in 2001-2002. King County Water and Land Resources Division, Department of Natural Resources and Parks, Seattle, WA.

Brown, Reade E. 1985. Management of Wildlife and Fish Habitats in Forests of Western Oregon and Washington. USDA Forest Service. Pacific Northwest Region.

Castelle, A.J. et al. 1992. Wetland Buffers: Use and Effectiveness. Washington Department of Ecology.

Center for Watershed Protection (CWP). 2003. Impacts of impervious cover on aquatic systems. Watershed Protection Research Monographs No. 1, Center for Watershed Protection, Ellicott City, MD.

City of Tumwater. 2002. Ordinance No. O2000-010.

Copsey, Alan D.

1993. The Protection Of Wildlife Under Washington's Growth Management Act. 16 U. Puget Sound L. Rev. 1101.

1999. Including Best Available Science in The Designation and Protection of Critical Areas Under The Growth Management Act. Seattle University Law Review.

2002. "Agricultural lands and the Growth Management Act," In About Growth. Spring OCD DNR (Washington Department of Natural Resources). 1998. Our Changing Nature.

2003. The Designation and Protection of Critical Areas Under the Growth Management Act. OCD.

Department of Community, Trade and Economic Development (CTED).

2002. Citations of the best available science for designating and protecting critical areas. Preliminary draft report, July 2001.

2003. Critical Areas Assistance Handbook: Protecting Critical Areas Within the Framework of the Washington Growth Management Act.

Department of Ecology, Department of Community, Trade and Economic Development (CTED). 2004. Questions and Answers on ESHB 1933 Critical Areas Protection Under the Growth Management Act and Shoreline Management Act

Downing, J., 1983, The Coast of Puget Sound: Its Processes and Development: Seattle, University of Washington Press.

Ecology (Washington State Department of Ecology).

1991. Washington State Wetlands Rating System.

1994. Guidelines for Developing Freshwater Wetlands Mitigation Plans and Proposals. Publication #94-29.

1997. Washington State Wetlands Identification and Delineation Manual. Pub. #96-94.

1998. How Ecology Regulates Wetlands. Publication #97-112.

1999. Open Space Taxation Act Current Use Assessment Program: Applying the Public Benefit Rating System as a Watershed Action Tool. Pub. # 99-108.

2000. Washington State Water Quality Assessment Section 305(b) Report. August 2000 Publication No. 00-10-0582001

2000. Washington State Wetland Mitigation Evaluation Study.

2001 a. Stormwater Management Manual for Western Washington. Water Quality Program.

2001 b. "FEMA & Ecology seek to improve flood maps", in Confluence, Vol.5 No. 1.

Federal Interagency Stream Restoration Working Group. 1998. Stream Corridor Restoration: Principles, Processes, and Practices. Government Printing Office Item No. 0120-A.

FEMA. 2001. Floodplain Management: Higher Regulatory Standards. Federal Emergency Management Agency.

Finlayson, David. 2003. "Puget Sound Drift Cells: The importance of waves and wave climate." In *Puget Sound Notes*. Issue No. 47. September 2003. Puget Sound Action Team.

Governor's Salmon Recovery Office (GSRO). 1999. Statewide Strategy to Recover Salmon: Extinction is Not an Option. Olympia, Washington.

Hagen, Carlos B. 1958. Lengths of shoreline in Washington State. Washington Department of Natural Resources, Olympia.

Hanley, Thomas A. and Jeffrey C. Barnard. 1999. Food Resources and Diet Composition in Riparian and Upland Habitats for Sitka Mice, Peromyscus keeni sitkensis. Canadian Field-Naturalist 11(3): 401-407.

1999. Spatial Variation in Populations Dynamics of Sitka Mice in Floodplain Forests. Journal of Mammology, 803(3):866-879.

Horner, Richard R. and Christopher W. May. 1999. Regional Study Supports Natural Land Cover Protection as Leading Best Management Practice for maintaining Stream Ecological Integrity. Comprehensive Stormwater & Aquatic Ecosystem 1999- Conference Papers.

Hudson, Wendy E. 1991. Landscape Linkages and Biodiversity. Defenders of Wildlife. Island Press. Washington D.C.

Independent Science Panel. (ISP). 2003. Review of Stormwater Management Manual for Western Washington (August 2001). Report 2003-1. June 2003. Olympia, Washington.

Interagency Committee for Outdoor Recreation (IAC). 2003. Washington Biodiversity Conservation Strategy Report: Making the Connections. Olympia, Washington.

Johnson, D.H. 2001. *Wildlife-Habitat Relationships in Oregon and Washington*. Oregon State University Press, Corvallis OR.

Kauffman, J. B., M. Mahrt, L. Mahrt, and W. D. Edge. 2001. Wildlife of Riparian Habitats. Chapter 14 in Johnson, D.H. *Wildlife-Habitat Relationships in Oregon and Washington*. 2001. Oregon State University Press, Corvallis OR.

Kelsey, K. A., and S. D. West. 1998. Riparian Wildlife, Chapter 10 in Naiman, R. J., and R. E. Bilby, eds., *River Ecology and Management*. Springer. New York.

Knutson, K. Lea and Virginia L. Naef. 1997. Management Recommendations for Washington's Priority Habitats: Riparian. Washington Department of Fish and Wildlife.

Labbe, Ted. Lower Hood Canal Shoreline changes and the human footprint: Lessons from Hood Canal. In Puget Sound Notes. Issue No. 47. September 2003. Puget Sound Action Team.

May, C.W., R.R. Horner, J.R. Karr, B.W. Marr, E.B. Welch. 1997. Effects of Urbanization on Small Streams in the Puget Sound Lowland Ecoregion. Watershed Protection Techniques 2(4):483-494.

May C. W., E. B. Welch, R. R. Horner, J. R. Karr, and B. W. Mar. 1997. Quality indices for urbanization effects in Puget Sound lowland streams. Department of Civil Engineering, University of Washington Water Resources Technical Report, No. 154.Seattle, Washington.

Mitsch, William J. and James G. Gosslink. 1993. Wetlands. John Wiley & Sons, Inc.

Mockler, Anna, et al. 1998. Results of Monitoring King County Wetland Mitigation. King County Dept. of Development and Environmental Services.

National Association of Home Builders Research Center (NAHB).

2003a. The Practice of Low Impact Development. U.S. Department of Housing and Urban Development Office of Policy Development and Research. 2003

2003b. Builder's Guide to Low Impact Development.

Natural Resources Conservation Service. 1997. National Resources Inventory.

NOAA (National Oceanic Atmospheric Administration) Wetlands and Fish: Catch the Link.

Noss, Reed F. et al. 1997. The Science of Conservation Planning: Habitat Conservation under the Endangered Species Act. Island Press.

NRC. 2002. Riparian Areas: Functions and strategies for management. Report of the National Research Council. National Academy Press

Pentilla, Daniel E. 2002. "Effects of Shading Upland Vegetation on Egg Survival for Summer-spawning Surf Smelt on Upper Intertidal Beaches in Puget Sound" from Proceedings of the Puget Sound Research-2001 Conference, February 12-14, 2001, Bellevue, WA. Puget Sound Water Quality Action Team. Olympia.

Poff, LeRoy N. et al. 1997. The Natural Flow Regime. BioScience. Vol.47.

Puget Sound Action Team.

2002. "More people = significant changes to the Sound's shorelines." In *Soundwaves*, Summer 2002 issue.

2004. GMA Update Recommendations to Local Governments in Puget Sound.

Richter, Klaus and Amenda l. Azous. 1997. Amphibian Distribution, Abundance and Habitat Use. In Wetlands and Urbanization: Implications for the Future. University of Washington.

Roni, Philip A et al. 2002. Review of Stream Restoration Techniques and a Hierarchical Strategy for Prioritizing Restoration in Pacific Northwest. North American Journal of Fisheries Management 22:1–20.

Simenstad, C. A. 1998. Appendix A: Estuarine Landscape impacts on Hood Canal and Strait of Juan de Fuca summer chum salmon and recommended actions. IN: Hood Canal/Eastern Strait of Juan De Fuca summer Chum Habitat Recovery Plan, March, 1999.

Spence, Brian C. et al. 1996. An Ecosystem Approach to Salmonid Conservation. Management Technology. TR-4501-96-6057. USDA.

Terich, Thomas A. 1991. Comments on Shoreline Management Act 20th Anniversary. Coastal Currents 16(6): 14.

USDA. 2001. Food for Fish, food for Thought: Managing the Invisible Components of Streams. Science Findings. Issue 32: March 2001. PNW Research Station. Portland.

USEPA, Development, Community and Environment Division. 2001. Our Built and Natural Environments. EPA Publication 231-R-01-002

US Fish and Wildlife Service (FWS)

1996 National Survey of Fishing, Hunting and Wildlife Associated Recreation.

2001. Food for Fish, food for Thought: Managing the Invisible Components of Streams. Science Findings. Issue 32: March 2001. PNW Research Station. Portland.

Vannote, R.L. et al. 1980. The river continuum concept. Canadian Journal of Fisheries and Aquatic Sciences. 37:130-137.

Ward, J.V. 1998. Riverine landscapes: Biodiversity patterns, disturbance regimes, and aquatic conservation. Biological Conservation 83: 269-278.

Washington Conservation Commission.

2002a. Habitat Limiting Factors Report Executive Summary: Water Resource Inventory Area 5. Stillaguamish Watershed

2002b. Habitat Limiting Factors Report Executive Summary: Water Resource Inventory Area 26. Cowlitz River System.

WDFW (Washington Department of Fish and Wildlife)

1992. Washington State Salmon and Steelhead Stock Inventory.

1997. Final Joint WDFW/Tribal Wild Salmonid Policy.

2002. 1999-01 Biennial Report.

2002. Species of Concern in Washington State

Priority Habitats and Species Program (*www.wa.gov/wdfw/hab/phspage.htm*)

Washington Wetlands—Time is running out, 11 p.

West, James. E. 1997. Protection and Restoration of Marine Life in the Inland Waters of Washington State. Puget Sound/Georgia Basin Env. Rpt. Series: No. 6. Puget Sound Action Team.

Williams, Gregory D. and Ronald M. Thom. 2001. Marine and Estuarine Shoreline Modification Issues. Prepared for the Aquatic Habitat Project Steering Committee, and jointly published by the White Paper. Washington State Departments of Fish and Wildlife, Ecology, and Transportation: Olympia, WA. (Available only as downloadable file at *www.wdfw.wa.gov/hab/ahg/*)

For a copy of the Habitat Protection Tool Kit, please go to: www.wecprotects.org

Acknowledgements

This revised and expanded Tool Kit replaces the version WEC published in 2002. The Washington Environmental Council (WEC) produced the following guidance for local government land use and shoreline planning for its Habitat Protection Campaign. Jerry Gorsline, Habitat Protection Campaign Director, is the principle author. Essential WEC staff support was provided by the following: Michael Rossotto, Legal Director; Josh Baldi, Policy Director, and Tom Geiger, Communications Director. Special thanks are also due to Jill Olson, WEC Legal Aid.

WEC also wishes to acknowledge the significant contribution to this publication made by the following professional advisors and citizen activists:

John Karpinski, Dan Henke, Daniel Fagan-Smith, Jennifer Dold, Toby Thaler, Adam Berger, Gerald Steel, Hillary Franz, Roger Leed, Attorneys; Brid Nowlan and Christy Norman from Audubon-Washington; Tim Trohimovich, 1000 Friends of Washington; Jan Aarts, Environmental Planner; Peggy Toeppel and Ann Aagard, League of Women Voters; Cygnia Rapp, Hydrologist; Janet Strong, Biologist; R.D. Grunbaum, Friends of Grays Harbor; Doug Canning, Department of Ecology; Harriet Beale, Puget Sound Action Team; Naki Stevens, People for Puget Sound, and John Mauro, Pilchuck Audubon.

Special thanks are also due to Michael Mason, who provided valuable assistance for this project in partial fulfillment of his requirements for the degree of Master of Public Administration, University of Washington; to Jim Brennan and Hilary Culverwell, whose research on the ecology of marine riparian vegetation and nearshore habitats proved invaluable to the author, and to Tom Holz, SCA Consulting Group, for his always trenchant guidance on stormwater issues.

Produced through funding from the Russell Family Foundation and the Public Involvement and Education Project, financed by proceeds from the Washington State Water Quality Account, and administered by the Puget Sound Action Team.

© 2004 Washington Environmental Council

The Washington Environmental Council (WEC) is a statewide environmental organization working to protect our land, air and water. WEC has over 3,700 individual and organizational members across Washington. One of our strengths comes from our number of members. If you are not a member, please consider joining. Contact our office at (206) 622-8103 or visit us on the web at: www.wecprotects.org

WASHINGTON ENVIRONMENTAL COUNCIL
PROTECTING OUR LAND, AIR AND WATER

615 Second Avenue, Suite 380
Seattle, WA 98104

Address service requested

206.622.8103
email: wec@wecprotects.org

web site: www.wecprotects.org

NON-PROFIT ORG.
U.S. POSTAGE
PAID
SEATTLE, WA
PERMIT #814